DRAFT

Schnitzer ASD Yard Riverbank Source Control Measures Feasibility Study Work Plan Gunderson Facility 4350 NW Front Avenue Portland, Oregon

Prepared for:
Gunderson LLC

August 30, 2013
1935-03.23

Ash Creek Associates
A Division of Apex Companies, LLC
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1.0 Introduction

This report presents the work plan for a feasibility study (FS) for source control at the Schnitzer ASD Yard riverbank at Gunderson, LLC's Front Avenue facility.

1.1 Purpose and Scope

Gunderson, LLC, owns and operates a railcar and barge manufacturing facility at 4350 NW Front Avenue, Portland, Oregon (the Facility). The Schnitzer ASD Yard is generally the upstream one third of the Facility and is also referred to in some Oregon Department of Environmental Quality (DEQ) documents as "Area 3." The source control evaluation (SCE) for the Schnitzer ASD Yard (Ash Creek, 2012) concluded that the presence of polychlorinated biphenyls (PCBs), lead, nickel, and zinc in riverbank soil and the potential for mass wasting of the riverbank slope warranted completion of an FS for a riverbank source control action. This work plan defines the process that will be used to complete an FS of source control actions for the Schnitzer ASD Yard riverbank.

1.2 Regulatory Framework

A portion of the Willamette River within the City of Portland, the Portland Harbor, was added to the Superfund National Priority List in December 2000. The approximate boundaries of the Portland Harbor Study Area are from river mile (RM) 1.9 to RM 11.8. The Portland Harbor cleanup will address both upland and in-water contamination. The U.S. Environmental Protection Agency (EPA) is the lead agency for the in-water study and cleanup, and the DEQ is the lead agency for upland studies and cleanup. The Facility is identified as DEQ Environmental Cleanup Site Information number 1155. This work is being completed under Voluntary Cleanup Agreement No. WMCVC-NWR-94-01 and Consent Order No. _____ between Gunderson and the DEQ. This FS work plan was prepared in accordance with the requirements set out in the DEQ-EPA Portland Harbor Joint Source Control Strategy (JSCS; DEQ, 2005) and DEQ guidance for feasibility studies (DEQ, 2006).

1.3 Facility and Site Description

The Facility covers approximately 63 acres and 4,000 lineal feet of river frontage along the west bank of the Willamette River between RM 8.5 and 9.2 (Figure 1). The Facility is bordered by Lakeside Industries on the northwest, NW Front Avenue and the Burlington Northern Santa Fe Railroad Rail Yard on the southwest, Georgia-Pacific Corporation on the southeast, and the Willamette River on the northeast (Figure 2).

As shown on Figure 2, the Facility is divided into three areas defined as (from downriver to upriver) Area 1, Area 2, and the Schnitzer ASD Yard (also referred to in some documents as Area 3). Areas 1 and 2 are primarily used for manufacturing. The Schnitzer ASD Yard is primarily used as a storage yard.

The Schnitzer ASD Yard covers approximately 20 upland acres and includes approximately 1,340 lineal feet of Willamette River frontage. The top of bank is approximately elevation 31 feet (all elevations NAVD88 unless otherwise indicated). The ordinary high water mark is 16.6 feet NGVD (U.S. Army Corps of Engineers, 2004) at RM 9, corresponding to 20.2 feet NAVD88. The in-water portion of the Portland Harbor Site is defined as below or equal to 13 feet NAVD88 (Integral, et al., 2011).

The subject of this FS (the Site) is the riverbank along the Schnitzer ASD Yard as shown on Figure 3. As discussed in Section 3.1 of the SCE, the Site consists of the strip of land between elevation 13 feet NAVD88 and the line approximately 25 horizontal feet landward of the top of the riverbank. This represents the upland area with the potential for mass wasting/erosion into the river. The majority of the riverbank at the Site is characterized by an approximately 1H:1V slope, although some riverbank areas are steeper. An outfitting dock runs along almost the entire length of the riverbank of the Schnitzer ASD Yard (1,300 feet out of a total of 1,340 feet). A naturally occurring sand/sediment beach has formed in front of riverbank, behind the Outfitting Dock.

The exposed riverbank surface is generally composed of concrete, rock rip rap, metal, wood, and brick, and the riverbank core is composed of dredge fill. The toe area of most of the riverbank in the Schnitzer ASD Yard is covered with a heterogeneous mixture of rock rip rap, grouted rip rap, concrete (Portland cement and asphalt) debris, grouted debris, bricks, and large pieces of steel. The upper portions of the bank, (generally above approximately elevation 20 NAVD88), are largely unarmored and some locations are steeper than the average riverbank slope of 1H:1V. The majority of the steeper riverbank areas are covered with anchored coir fabric and planted with native vegetation. Silt fencing is also present in some of these areas to deter geese from feeding on the plantings.

2.0 Preliminary Results of Source Control Evaluation

2.1 Locality of the Facility

The locality of the facility (LOF) is defined by the locus of points where a human or ecological receptor either contacts or is reasonably likely to come into contact with chemical constituents originating at the Site. The LOF is based on the location, fate, and transport of chemical constituents. The LOF consists of the Site as defined in Section 1.3 together with the near-shore surface water/sediment adjacent to the Site. Figure 4 shows the approximate LOF.

2.2 Land Use

Based on historical and current site use and zoning, the land use in the LOF is industrial. Given the industrial use of the upland and waterfront, there is no substantive terrestrial habitat in the LOF.

2.3 Beneficial Use of Groundwater and Surface Water

Except for potential recharge to surface water, groundwater is not used in the LOF. Surface water serves as ecological habitat and is used for commerce and recreation. Future potential use of surface water includes drinking water.

2.4 Relevant Federal, State, and Local Laws and Regulations

It was assumed for the FS work plan that relevant federal, state, and local laws and regulations would be the same as the applicable or relevant and appropriate requirements (ARARs) developed for the draft Portland Harbor feasibility study. Table 3.4-1 from the draft Portland Harbor feasibility study, listing the Portland Harbor ARARs, is reproduced in Appendix A.

2.5 Preliminary Source Control Goal Concentrations

Because impacts from bank erosion depend on both chemical concentration and erosion rate, there is no pre-defined soil chemical concentration that is unacceptable from a riverbank source control perspective. Additionally, sediment cleanup levels for Portland Harbor have not been finalized. The JSCS guidance provides soil screening levels that define an acceptable soil concentration for source control purposes – that is, concentrations below a screening level are acceptable, but exceeding the screening level indicates only that further evaluation is required. Given the lack of cleanup levels and the uncertainty in defining acceptable concentrations, the JSCS screening levels will be used as concentrations for preliminary source control goal concentrations to address in-water related receptors. These screening levels are based on ecological exposure to sediment or bioaccumulation resulting from exposure to sediment. Therefore, this approach assumes that soil could migrate into sediment with no change in the concentration. The source control goal concentrations may be refined as new information becomes available. Also, sensitivity analyses may be completed to evaluate potential impacts on remedy selection resulting from changes in cleanup levels. For upland receptors, there are no ecological receptors so DEQ occupational RBCs will be used. Table 1 lists the preliminary source control goal concentrations for the primary chemicals of concern (COCs).

2.6 Extent of Soil Above Preliminary Source Control Goals

As discussed in the SCE (Ash Creek, 2012), lead, nickel, zinc, and PCBs are the primary COCs with respect to potential riverbank erosion. Other COCs may exceed screening levels, but source control to address these four COCs will also address other COCs exceeding screening levels. Figures 5 through 8 show the extent of COCs in riverbank soil relative to the preliminary source control goals. From the figures, it may be observed that higher relative concentrations of COCs occur in the area upriver of the Gantry, but exceedances of preliminary source control goals are present throughout the Site.

2.7 Preliminary Hot Spots

Soil hot spot concentrations are defined as a multiplier applied to the acceptable risk-based concentration (the multiplier is 100 for human carcinogens and 10 for ecological and human non-carcinogens). Normally, these multipliers would be applied to the risk-based goals to estimate a hot spot concentration. However, in this case the risk-based concentration is unknown and the JSCS screening levels are being used as a surrogate. To account for this uncertainty, a range of risk-based concentrations was considered for evaluating preliminary hot spots.

For the lower end of the range, JSCS bioaccumulation values (where applicable) were used. For the upper end of the range, JSCS MacDonald PEC screening levels were used. Table 2 presents the riverbank soil hot spot concentrations. Figures 9 and 10 show the locations of soil samples with concentrations exceeding the preliminary hot spot levels (lower range and upper range, respectively).

Hot spots may also be identified based on mobility and the ability to reliably contain the impacted soil. Hot spots are not expected at the Site based on these criteria.

2.8 Additional Work to Support Feasibility Study

Lead was detected in surface soil samples at concentrations up to 4,160 milligrams per kilogram (mg/kg). If excavated, this soil could be a characteristic hazardous waste depending on the leachability of the lead. Surface soil samples will be collected from the vicinity of sample S3-7 and analyzed for leachable lead.

3.0 Potential In-Water Remedies

The draft Portland Harbor feasibility study was reviewed to identify the currently proposed in-water remedy for the area immediately adjacent to the Site. Proposed in-water remedies are summarized on Figures 7.2-1 through 7.2-10 of the draft Portland Harbor feasibility study. Active cleanup of sediments is proposed for this area in all of the alternatives except No Action. For removal-focused alternatives, the draft feasibility study proposes an engineered cap beneath the dock structures and dredging elsewhere. For the integrated-focused alternatives, the proposed remedy is in-situ treatment everywhere adjacent to the shoreline. *In situ* treatment would consist of broadcasting activated carbon onto the sediment surface.

4.0 Feasibility Study Evaluation Process

4.1 Determining Areas/Volumes Needing Source Control Action

Areas and volumes will be determined based on the locations of samples exceeding source control goals and hot spot levels. Potential depths will be limited to the depth corresponding to a riverbank slope ranging

from the current slope to not flatter than 3 horizontal to 1 vertical. Calculations will be completed using standard earthwork software and/or hand scaling/calculations.

4.2 Development of Source Control Objectives

Source control objectives will be developed that specify the media, exposure pathways, and corresponding concentration goals. These objectives are preliminarily identified in this section. These objectives may be achieved with a range of remedial options including treatment, engineering controls, institutional controls, or removal.

4.2.1 Media

Soil is the only medium of concern for the riverbank source control evaluation.

4.2.2 Exposure Pathways

4.2.2.1 Upland Pathways

The Site is used for industrial purposes. There are no terrestrial ecological pathways. Occupational direct contact is an assumed complete pathway.

4.2.2.2 In-Water Pathways

The riverbank is presumed to have the potential to erode into the river where COCs could impact ecological receptors in the sediments or water column, impact recreational users of the river, or travel up the food chain to ecological predators or human receptors.

4.2.3 Preliminary Source Control Goals

The following are the preliminary source control goals:

- Prevent human direct contact with riverbank soils with concentrations of COCs above the upland preliminary source control goal concentrations (see Table 1).
- Prevent migration to the river of riverbank soils with concentrations of COCs above the in-water preliminary source control goal concentrations (see Table 1).
- Reduce hot spots of contamination to non-hot spot levels in soil by reducing the concentration, volume, or mobility through treatment or excavation and offsite disposal. See Table 2 for preliminary hot spot concentrations.

4.3 Interim Actions and Relationship to SCOs and Final Source Control

Interim actions completed to date have focused on decreasing potential erosion through enhanced riverbank vegetation. Activities completed to date include (Apex, 2013):

- Installation of anchored coir fabric (in steep re-vegetation areas) and establishment of native vegetation;
- Operation of an irrigation system during dry periods;
- Installation of silt control fences to discourage geese from entering and damaging re-vegetation areas;
- Routine removal of invasive/competing vegetation;
- Repairing/replacing damaged coir fabric; and
- Replacing vegetation lost to die-off or damage from wildlife.

These efforts will continue. Additionally, riprap armoring is planned to be installed at the base of the riverbank at selected areas where the riverbank is steeper than average (Apex, 2013). The purpose of the rip rap installation is to help maintain the stability of the riverbank, pending a more permanent remedy. The rip rap will reduce erosion risk near the toe of the slope and support the re-vegetation efforts higher on the bank.

Completed and proposed interim actions are designed to address primarily the second preliminary source control goal of preventing migration of bank soil into the river. Currently, the Schnitzer ASD Yard is used primarily for material storage, and there is little or no occupational use of the riverbank. Therefore, under current site use, there is little or no direct contact exposure to the river bank and interim actions to address that preliminary source control goal are not needed.

Final source control actions will be selected from a range of potential alternatives that may include treatment, engineering controls, institutional controls, or removal. The interim actions do not preclude any of these potential actions and likely will be used at least in part with any of these alternatives.

4.4 Identification of General Response Actions

Consistent with DEQ rules and guidance, a range of general response actions will be considered in developing potential source control actions. General response actions considered will include the following:

- No Action – Required by rule as a baseline for comparison.
- Institutional Controls – These are legal or administrative measures that reduce exposure to COCs. These can be effective, especially on industrial sites where there is good access control; however, effectiveness is limited for soil migration to the river.

- Engineering Controls – These are physical measures such as fences or caps that eliminate or reduce exposure to COCs. Engineering controls will be included in alternatives to be evaluated.
- Treatment – Treatment could be conducted either in-place or after excavation, and there are a range of treatment methods available including physical, chemical, thermal, and biological approaches. Given the location of the Site on the riverbank, in-place treatment is likely to be screened out early. Additionally, both metals and organic COCs are present and these often require different treatment techniques, reducing the feasibility of chemical, thermal, and biological approaches.
- Removal – Removal of riverbank soils will be considered, especially with respect to potential hot spots.

4.5 Development of Source Control Alternatives

4.5.1 Identification and Screening of Process Options

For each of the general response actions, representative technologies and process options will be selected. These technologies/process options will be obtained from in-house and publicly available databases of remediation technologies. The technologies will be presented in a table with a brief description of the technology and a screening evaluation of the technology based on effectiveness, implementability, and cost. Screening will be based on a qualitative evaluation against these criteria (e.g., high, medium, low) for the site conditions. The rationale for screening technologies in or out will be documented in the table.

4.5.2 Assembly of Alternatives

Technologies that pass the screening step will be assembled into viable Site-wide alternatives that will address the source control objectives. At a minimum, there will be at least one alternative in each of the following general response actions: no action, engineering controls, and removal. Depending on the outcome of the technology screening, there may be a treatment focused alternative. Treatment technologies (e.g., stabilization of metals, sieving of excavated soil) will likely be included in at least some of the removal alternatives.

4.5.3 Screening of Alternatives

Given that there is only one medium of concern and relatively few COCs, it is not expected that screening of alternatives will be required.

4.6 Detailed Analysis of Source Control Alternatives

For each alternative, the detailed analysis will include the following elements.

- Description – The alternative will be described in sufficient detail to support the subsequent cost estimate. Conceptual design elements such as the volume of soil excavated, area of a cap, time to complete construction and achieve goals, and similar features will be described. Specific features will be included on a site plan, as appropriate. Additionally, compatibility of the source control action with the potential final in-water actions will be discussed.
- Protectiveness – This section states how the alternative achieves the source control goals.
- Balancing Factors – For each of the balancing factors (effectiveness, long-term reliability, implementability, implementation risk, and reasonableness of cost) relevant issues related to the alternative will be discussed. Cost estimates with a target level of accuracy of plus 50 percent to minus 30 percent will be prepared. Cost estimates will be prepared consistent with EPA (2000) guidance except that the net discount factor used will be 5 percent (EPA's recommended discount factor of 7 percent is based on historical investment returns from the 1990s – returns over the past decade have been more modest).
- Hot Spots – The extent to which an alternative addresses hot spots through either treatment or off-site disposal will be discussed.

4.7 Comparative Analysis of Source Control Alternatives

4.7.1 One-To-One Comparison

The comparative analysis is a one-to-one assessment of the relative merits of each alternative for each of the evaluation criteria. Protectiveness and treatment/removal of hot spots will be summarized for each alternative. For the balancing factors, each alternative will be ranked favorable, equal, or unfavorable in relation to every other alternative for each of the balancing factors. These rankings will be given a score of 1, 0 or -1, respectively, and the scores will be summed to provide an overall relative ranking of the alternatives. The ranking will be completed assuming an equal weighting of the balancing factors, and only alternatives that meet protectiveness requirements will be ranked.

4.7.2 Higher Cost Threshold for Treatment/Removal of Hot Spots

In evaluating the alternatives, special consideration will be given to treatment or removal of hot spots. This higher-cost threshold analysis will be completed as follows.

- If the highest ranked alternative includes elimination of the hot spot through treatment or removal, no further analysis will be completed.
- If the highest ranked alternative does not address the hot spot through treatment or removal, the alternatives will be re-ranked without consideration of cost. If the same alternative remains the highest ranked alternative, then the consideration of a higher cost threshold will have been met.

- In the event that the re-ranking results in a different higher ranked alternative, the marginal benefit will be considered relative to the marginal cost (of treating or removing the hot spot) to assess if the higher costs are comparable to the gain.

4.8 Compliance with Applicable or Relevant and Appropriate Requirements

For the recommended alternative, the FS will describe how the ARARs in Appendix A will be addressed. These may be addressed through either the explicit process or through state/federal permit exemptions. If exemptions are anticipated, the substantive requirements that will be met will be identified.

4.9 Addressing Concerns of Owner, Neighbors, and Community

The FS is being prepared by the property owner so will incorporate owner concerns. For example, the implementability evaluation will include compatibility of the source control action with the property use. Most of the Site does not directly abut a neighboring property so substantive neighbor concerns are not anticipated. A small part of the southern end of the Site abuts an industrial property operated by Georgia Pacific. Little activity occurs at that portion of the Georgia Pacific property. The Site is in an industrial area that is consistent with typical anticipated construction activities, so community concerns are not anticipated. However, the DEQ process includes a public comment opportunity and any concerns raised during the public comments can be addressed in the record of decision or will be addressed during source control design and implementation.

4.10 Residual Risk Assessment

A residual risk assessment will be completed for the recommended alternative. The residual risk assessment will include two parts: a quantitative assessment of risk associated with remaining COCs and a qualitative assessment of the adequacy of engineering/institutional controls. Given the uncertainty associated with impacts associated with erosion of bank soils to the river, the quantitative assessment will focus on occupational direct contact exposures. The qualitative assessment will focus on the final riverbank stability with respect to slopes and erosion protection.

5.0 References

Ash Creek, 2012. Supplemental Schnitzer ASD Yard Riverbank Soil Source Control Evaluation and Focused Feasibility Study Work Plan. August 30, 2012.

Ash Creek, 2013. Area 2 and Schnitzer ASD Yard, Riverbank Interim Source Control Measures Work Plan. April 30, 2013.

DEQ, 2006. Guidance for Conducting Feasibility Studies, Oregon Department of Environmental Quality. July 1, 1998 (Updated November 1, 2006).

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U.S. Army Corps of Engineers, 2004. Portland-Vancouver Harbor Information Package, Second Edition, Reservoir Regulation and Water Quality Section. November 2004.

USEPA, 2000. A Guide to Developing and Documenting Cost Estimates During the Feasibility Study. EPA 540-R-00-0002, OSWER 9355.0-75. July 2000.

Table 1

Preliminary Source Control Goal Concentrations

Schnitzer ASD Yard Riverbank Soil Focused Feasbility Study Work Plan

Gunderson, LLC. - Portland, Oregon

Chemical of Concern	Units	Preliminary Source Control Goal Concentration	
		In-Water[1]	Upland[2]
Lead	mg/kg	17	800
Nickel	mg/kg	48.6	20,000
Zinc	mg/kg	459	--
PCBs (Total)	µg/kg	0.39	560

Notes

1. From JSCS recommended upland source control screening level (DEQ, 2005).

2. From DEQ Risk-Based Concentrations for occupational receptors.

Table 2

Preliminary Hot Spot Concentrations

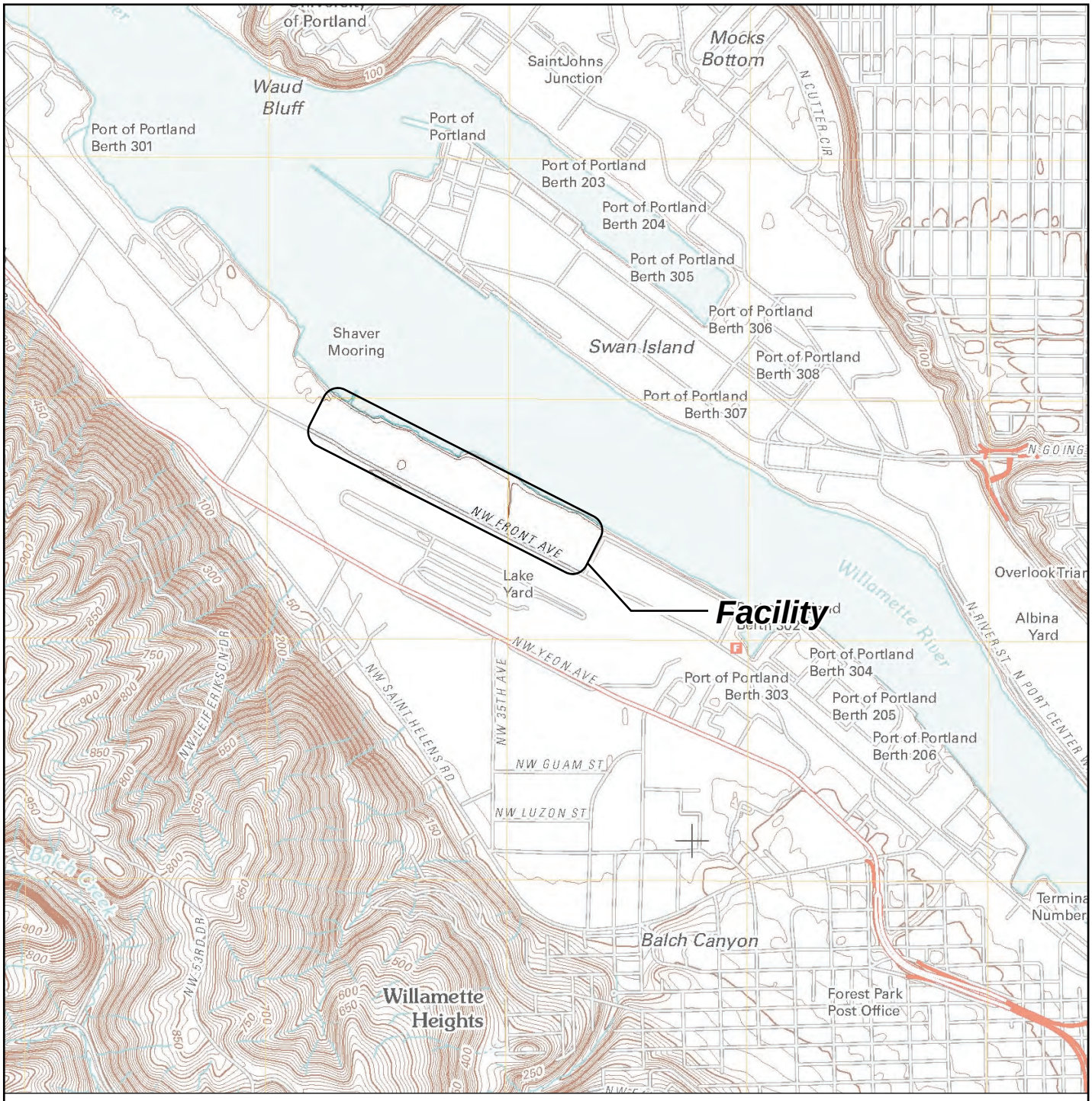
Schnitzer ASD Yard Riverbank Soil Focused Feasbility Study Work Plan

Gunderson, LLC. - Portland, Oregon

Chemical of Concern	Units	Risk-Based Screening Level[1]	Basis	Hot Spot Multiplier	Preliminary Hot Spot Concentration
Lead	mg/kg	17	Default Background	10	170
		128	Ecological	10	1,280
Nickel	mg/kg	48.6	Ecological	10	486
Zinc	mg/kg	459	Ecological	10	4,590
PCBs (Total)	µg/kg	0.39	Human Carcinogen	100	39
		676	Ecological	10	6,760

Note

1. From JSCS (DEQ, 2005), MacDonald PEC except: lead low range from former DEQ default background; PCB low range from the JSCS bioaccumulative.



Note: Base map prepared from USGS 7.5-minute quadrangle of Portland, OR, dated 2011 as provided by USGS.gov.

0 2,000 4,000

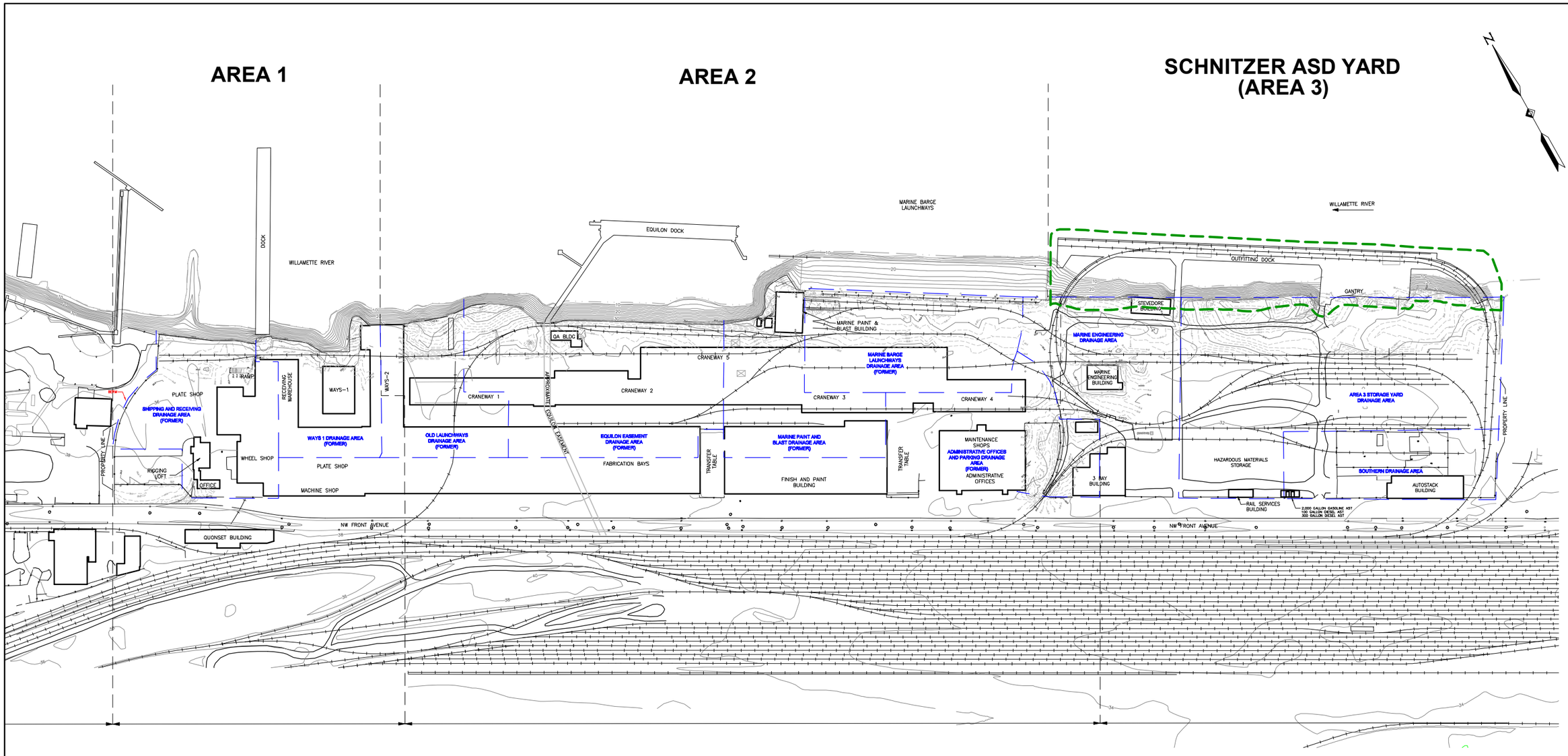
Approximate Scale in Feet

N

Facility Location Map

Schnitzer ASD Yard
Riverbank Source Control Feasibility Study Work Plan
Gunderson, LLC
Portland, Oregon

Apex Companies, LLC 3015 SW First Avenue Portland, Oregon 97201	Project Number	1935-03	Figure 1
	August 2013		



0 300 600

Scale in Feet

NOTE:
1) Base map prepared from a Johnson Land Survey and OSP-BASE-STW provided by Gunderson, LLC.

Site Vicinity Plan

Schnitzer ASD Yard
Riverbank Source Control Feasibility Study Work Plan
Gunderson, LLC
Portland, Oregon

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Portland, Oregon 97201

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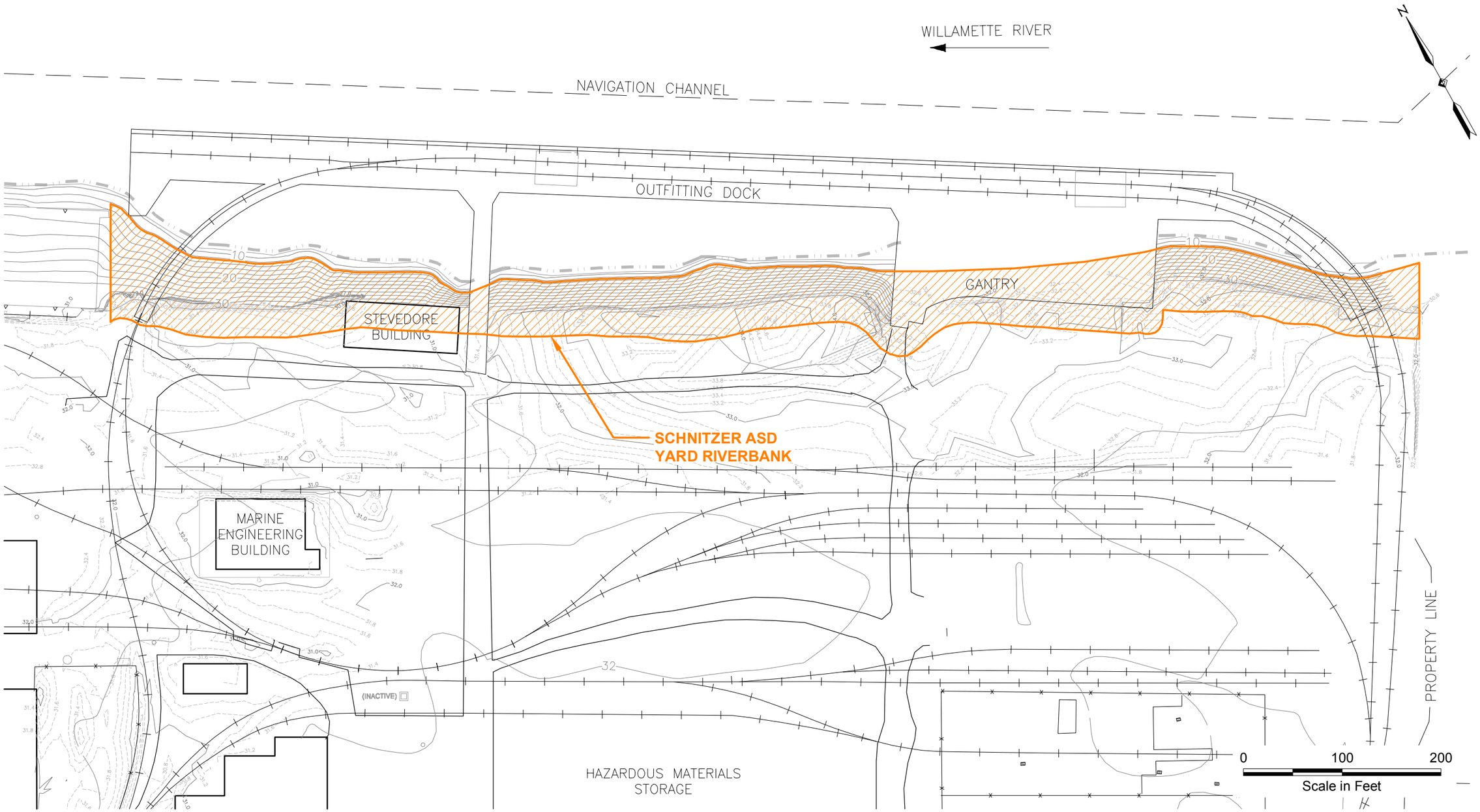

NOTES:

1) Base map prepared from a Johnson Land Survey and OSP-BASE-STW provided by Gunderson, LLC.

Site Plan

Schnitzer ASD Yard
Riverbank Source Control Feasibility Study Work Plan
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Portland, Oregon

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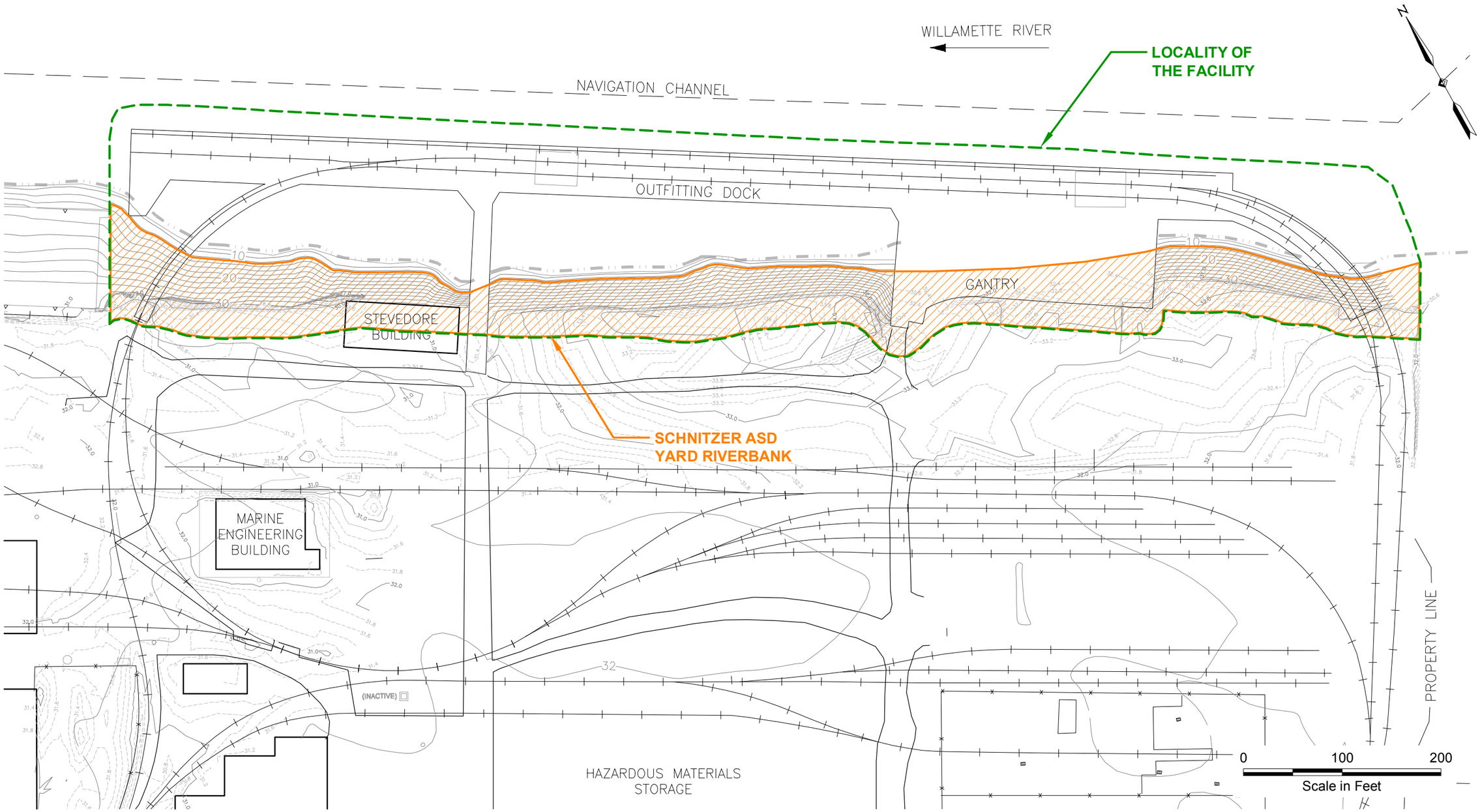

NOTES:

1) Base map prepared from a Johnson Land Survey and OSP-BASE-STW provided by Gunderson, LLC.

Locality of the Facility

Schnitzer ASD Yard
Riverbank Source Control Feasibility Study Work Plan
Gunderson, LLC
Portland, Oregon

Apex Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

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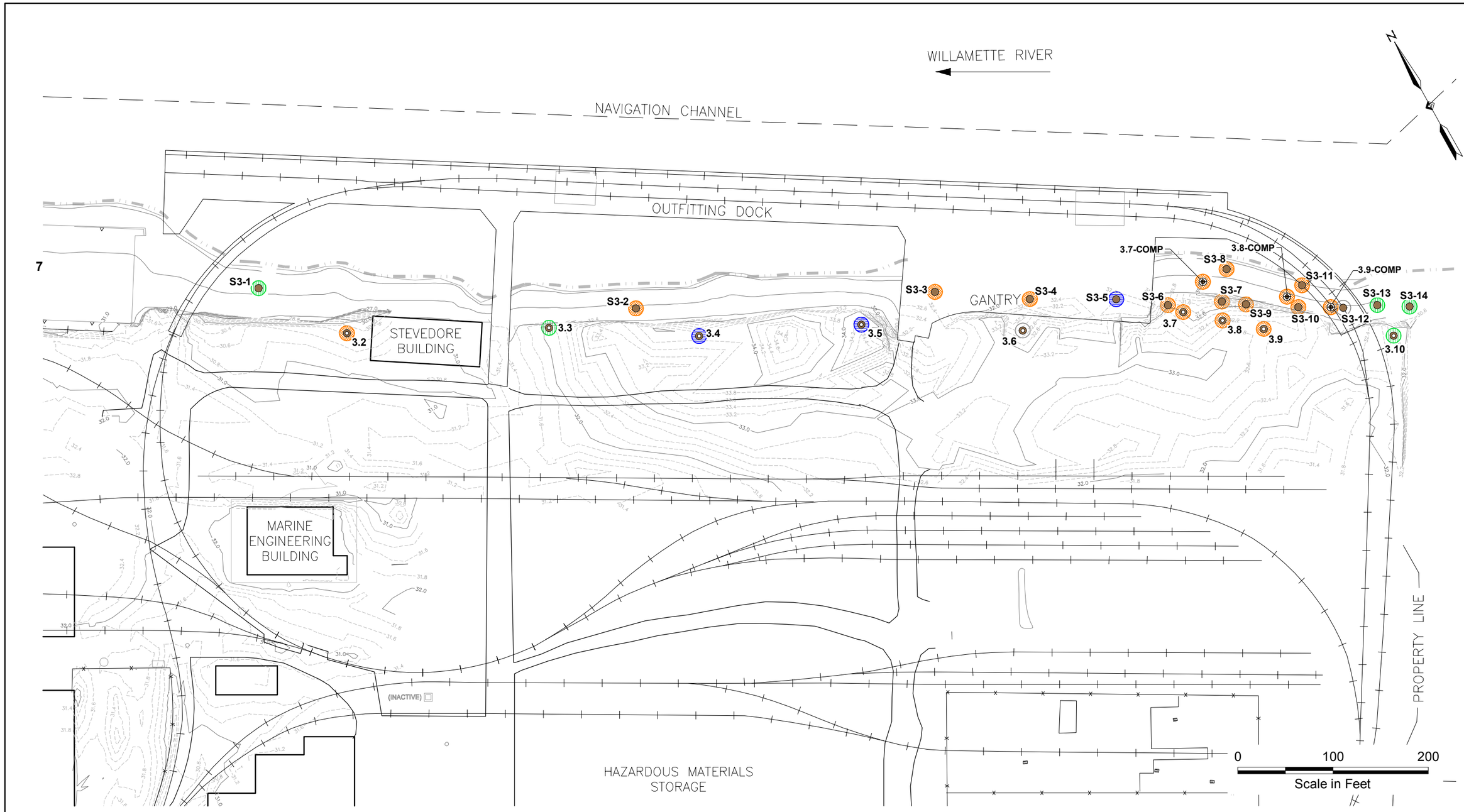

Legend:

3.10	Vector Borehole Location
S3-14	Riverbank Surface Sample Location
3.9-COMP	Composite Riverbank Sample Location

Magnitude of Exceedance above JSCS Screening Level in Soil:

- No Exceedance
- 1 - 20
- 20.1 - 50
- 50.1 - 250

NOTES:
1) Base map prepared from a Johnson Land Survey and OSP-BASE-STW provided by Gunderson, LLC.
2) JSCS = Joint Source Control Strategy
3) Only sample locations that were evaluated for the Source Control Evaluation are shown.

Lead Exceeding Preliminary Source Control Goal Concentration

Schnitzer ASD Yard
Riverbank Source Control Feasibility Study Work Plan
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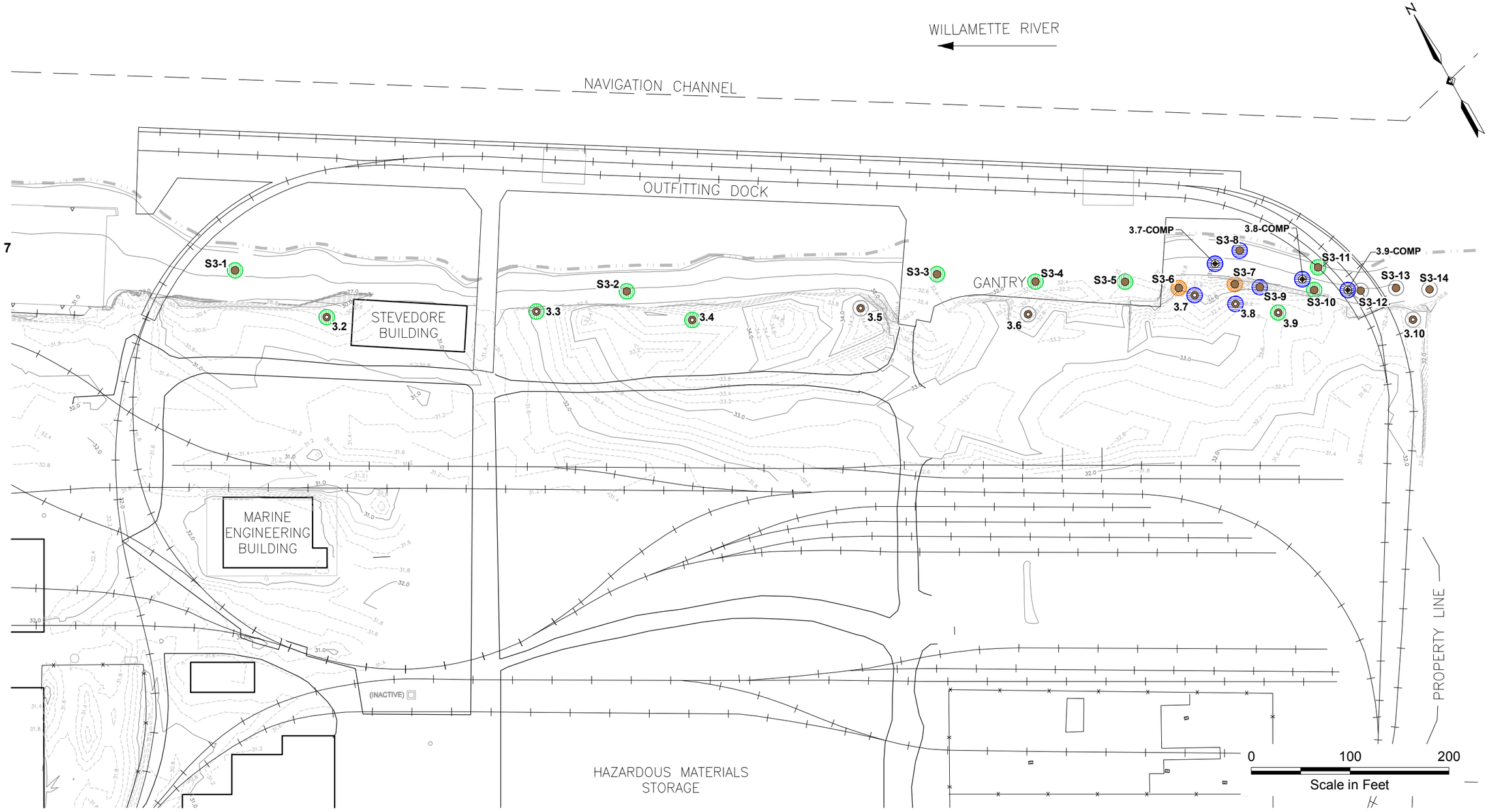

Legend:

3.10	Vector Borehole Location
S3-14	Riverbank Surface Sample Location
3.9-COMP	Composite Riverbank Sample Location

Magnitude of Exceedance above JSCS Screening Level in Soil:

- No Exceedance
- 1 - 5
- 5.1 - 10
- 10.1 - 35

NOTES:
1) Base map prepared from a Johnson Land Survey and OSP-BASE-STW provided by Gunderson, LLC.
2) JSCS = Joint Source Control Strategy
3) Only sample locations that were evaluated for the Source Control Evaluation are shown.

Nickel Exceeding Preliminary Source Control Goal Concentration

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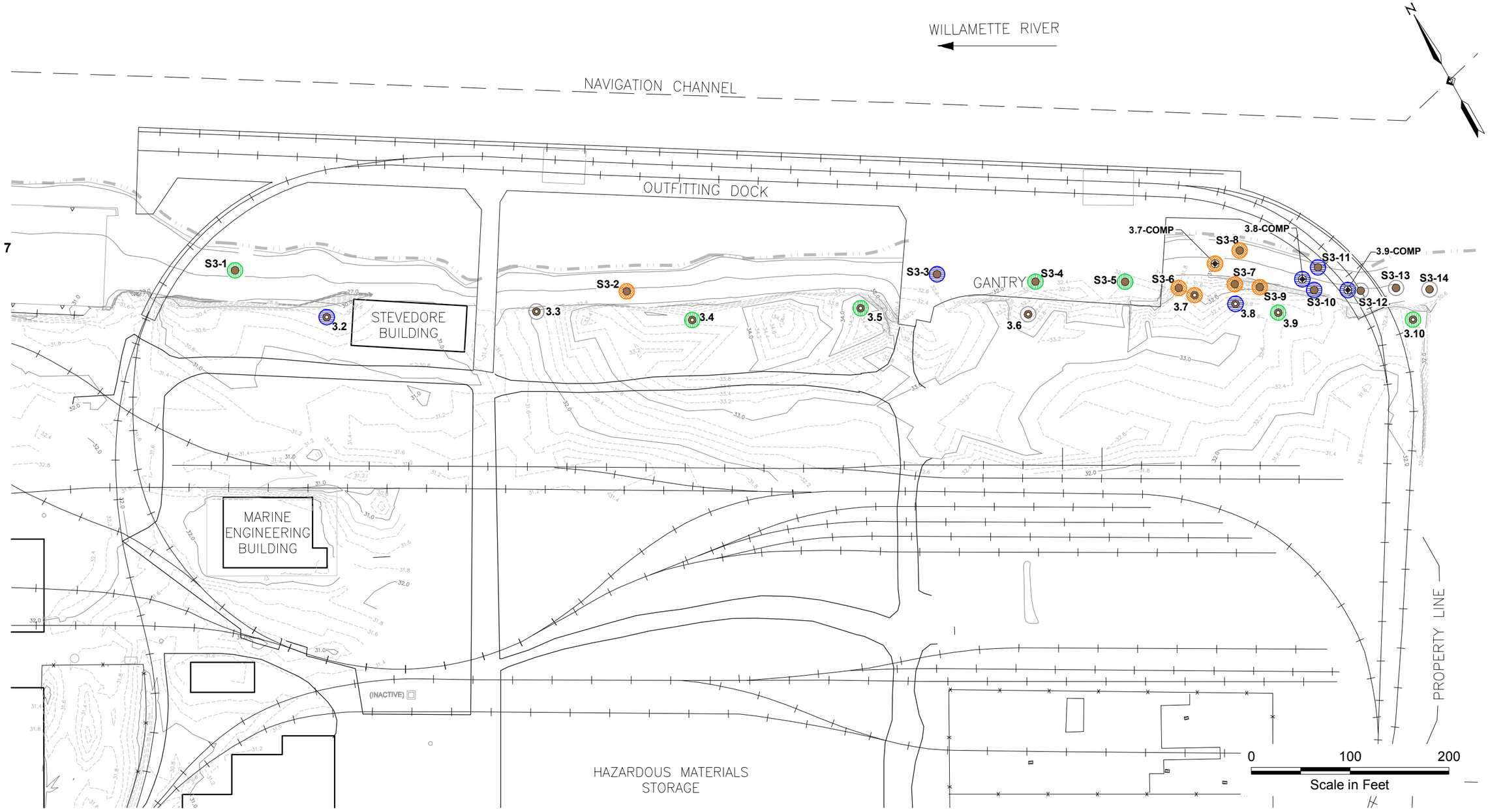

Legend:

3.10	Vector Borehole Location
S3-14	Riverbank Surface Sample Location
3.9-COMP	Composite Riverbank Sample Location

Magnitude of Exceedance above JSCS Screening Level in Soil:

- No Exceedance
- 1 - 5
- 5.1 - 10
- 10.1 - 21

NOTES:
1) Base map prepared from a Johnson Land Survey and OSP-BASE-STW provided by Gunderson, LLC.
2) JSCS = Joint Source Control Strategy
3) Only sample locations that were evaluated for the Source Control Evaluation are shown.

Zinc Exceeding Preliminary Source Control Goal Concentration

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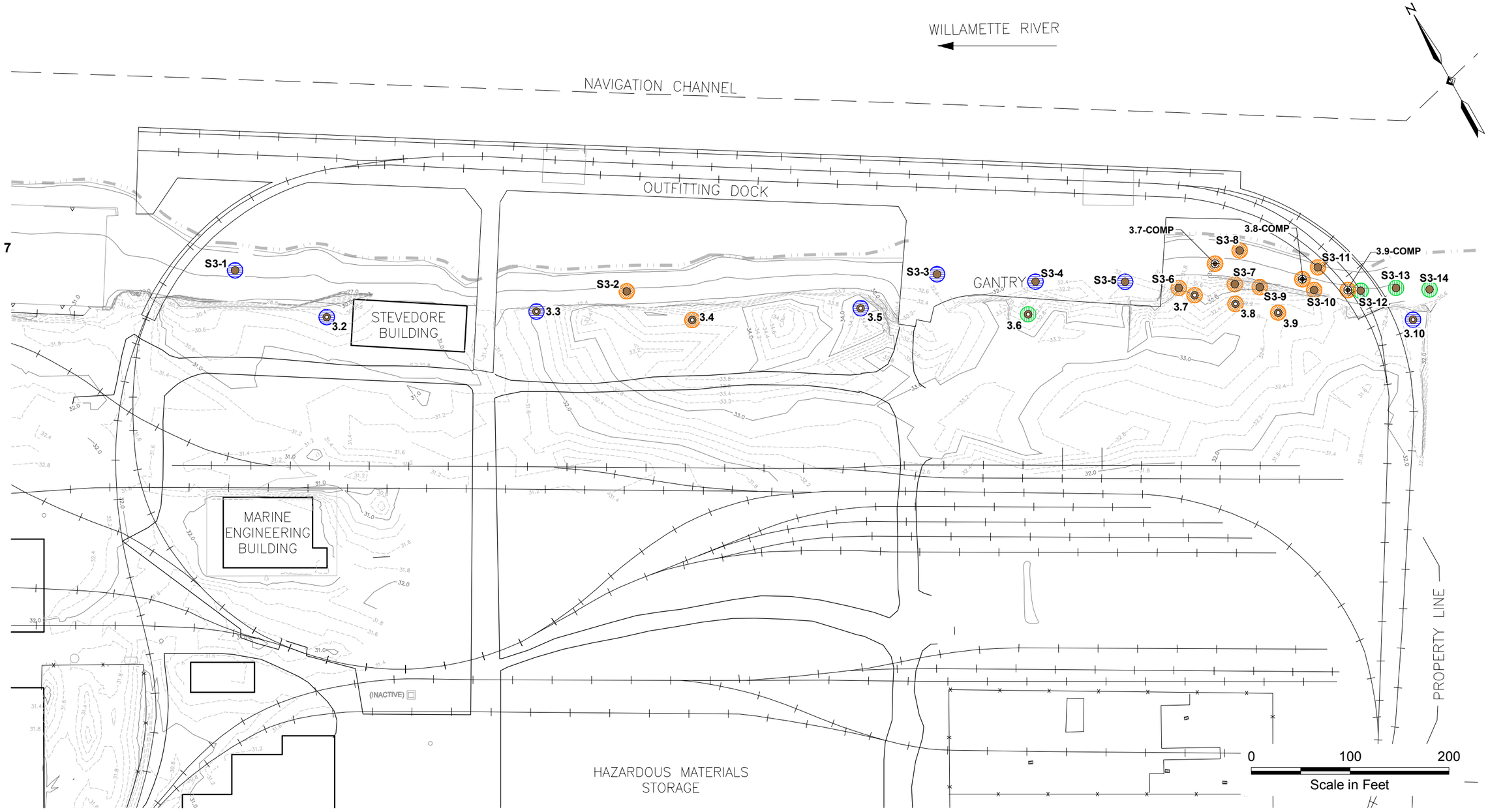

Legend:

3.10	Vector Borehole Location
S3-14	Riverbank Surface Sample Location
3.9-COMP	Composite Riverbank Sample Location

Magnitude of Exceedance above JSCS Screening Level in Soil:

- No Exceedance
- 1 - 100
- 100.1 - 5,000
- 5,000.1 - 80,000

NOTES:
1) Base map prepared from a Johnson Land Survey and OSP-BASE-STW provided by Gunderson, LLC.
2) JSCS = Joint Source Control Strategy
3) Only sample locations that were evaluated for the Source Control Evaluation are shown.
4) PCBs = Polychlorinated Biphenyls

PCBs Exceeding Preliminary Source Control Goal Concentration

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Project Number	1935-03	Figure
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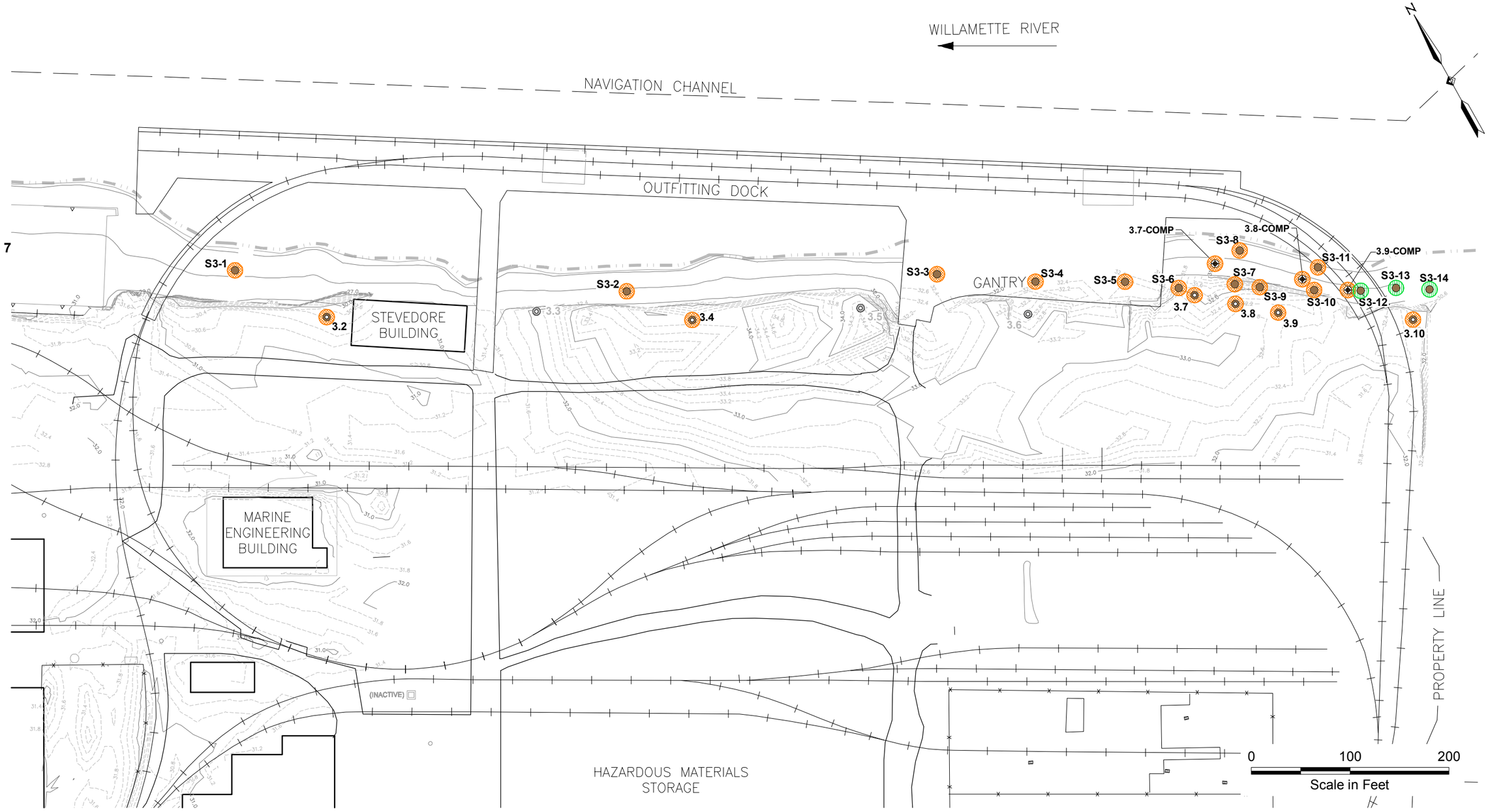


Legend:

3.10	Vector Borehole Location		Greater Than Preliminary Hot Spot Level
S3-14	Riverbank Surface Sample Location		Less Than Preliminary Hot Spot Level
3.9-COMP	Composite Riverbank Sample Location		

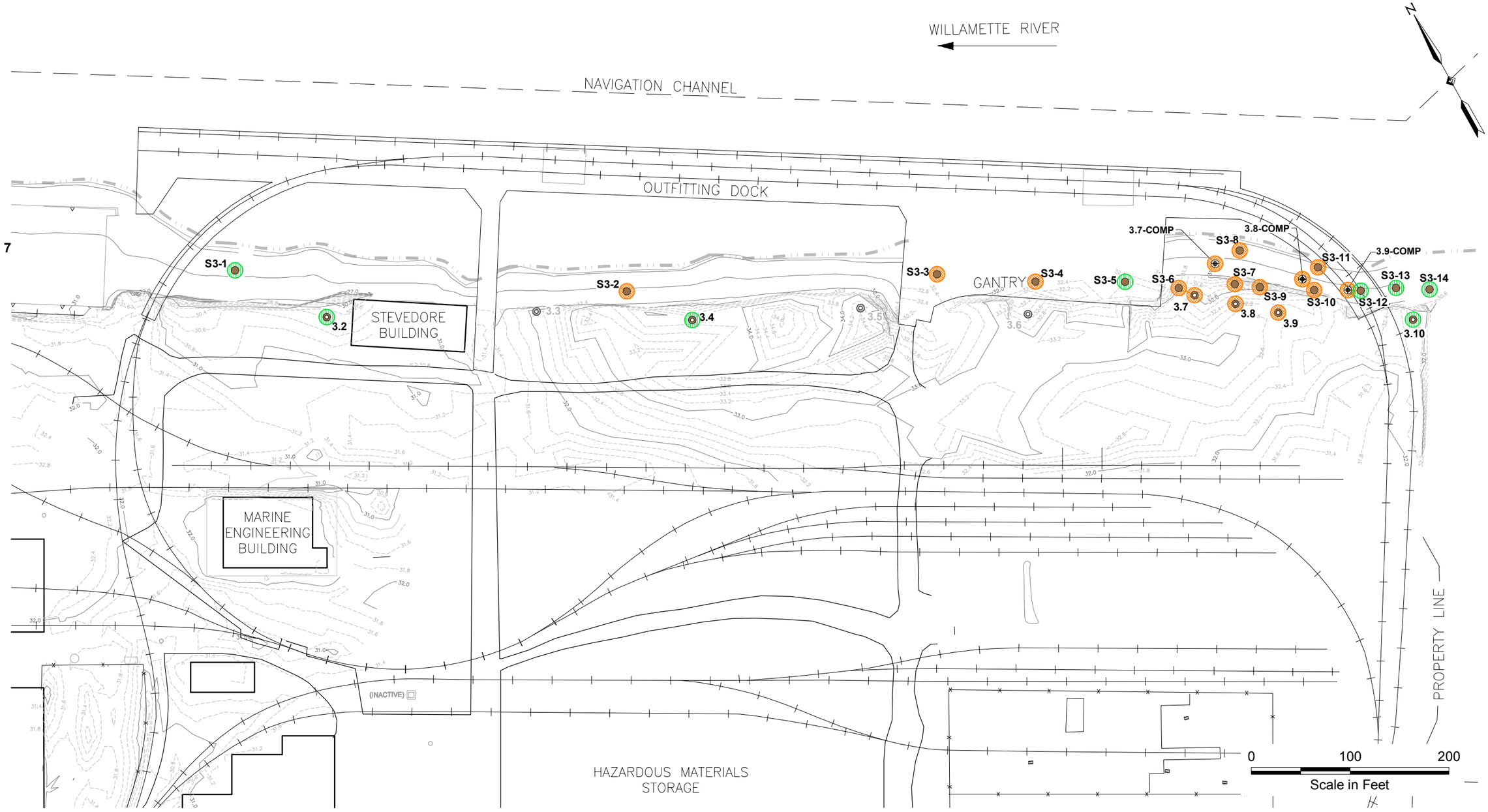
NOTES:
1) Base map prepared from a Johnson Land Survey and OSP-BASE-STW provided by Gunderson, LLC.
2) Only sample locations that were evaluated for the Source Control Evaluation are shown.
1) PCBs = Polychlorinated Biphenyls
2) Gray indicates that a sample was not analyzed for constituent.

Samples Exceeding Preliminary Hot Spot Levels - Lower Range

Schnitzer ASD Yard
Riverbank Source Control Feasibility Study Work Plan
Gunderson, LLC
Portland, Oregon

Apex Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

Project Number	1935-03	Figure
August 2013		9



Legend:

3.10	Vector Borehole Location		Greater Than Preliminary Hot Spot Level
S3-14	Riverbank Surface Sample Location		Less Than Preliminary Hot Spot Level
3.9-COMP	Composite Riverbank Sample Location		

NOTES:
1) Base map prepared from a Johnson Land Survey and OSP-BASE-STW provided by Gunderson, LLC.
2) Only sample locations that were evaluated for the Source Control Evaluation are shown.
1) PCBs = Polychlorinated Biphenyls
2) Gray indicates that a sample was not analyzed for constituent.

Samples Exceeding Preliminary Hot Spot Levels - Upper Range

Schnitzer ASD Yard
Riverbank Source Control Feasibility Study Work Plan
Gunderson, LLC
Portland, Oregon

Apex Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

Project Number	1935-03	Figure
August 2013		10

Appendix A

Table 3.4-1 of Draft Portland Harbor Feasibility Study

Table 3.1-1. Identification of Contaminants Posing Potentially Unacceptable Risk and Contaminants of Concern

Human Health Fish Consumption	Human Health Shellfish Consumption	Human Health Direct Sediment Contact	Benthic Invertebrate Community	Other Ecological Receptors
Contaminants Posing Potentially Unacceptable Risk				
Human Health: Contaminants with excess cancer risk estimates greater than 1×10^{-6} or an HQ greater than 1 for any RME scenario. *Ecological: Contaminants with HQs greater than or equal to 1.0.*				
26 contaminants[1], including metals, PAHs, PCBs, dioxins/furans, pesticides, PBDEs, and other SVOCs (see draft final BHHRA Table 7-1)	17 contaminants[1], including metals, PAHs, PCBs, dioxins/furans, pesticides, and other SVOCs (see draft final BHHRA Table 7-1)	11 contaminants, including metals, PAHs, PCBs, and dioxins/furans (see draft final BHHRA Table 7-1)	47 sediment contaminants, including metals, PAHs, PCBs, dioxins/furans, pesticides, and other SVOCs (see draft final BERA Tables 6-10 and 6-11) 54 TZW contaminants including metals, PAHs, pesticides, VOCs, and other SVOCs (see draft final BERA Table 6-43)	**Fish**- 59 contaminants[2] (see draft final BERA Table 7-44) **Birds**- 12 contaminants (see draft final BERA Table 8-37) **Mammals**- 6 contaminants (see draft final BERA Table 8-37) **Amphibians**- 33 contaminants[3] (see draft final BERA Table 9-5) **Aquatic Plants**- 33 contaminants3 (see draft final BERA Table 10-2)
Contaminants of Concern				
Human Health: Contaminants with excess cancer risk estimates greater than 1×10^{-4} or an HQ greater than 1 were selected as COCs based on magnitude and scale of risk, the frequency of detection, and uncertainties associated with the risk posed by the COC. *Ecological: Selection based on risk estimates, magnitude of HQs, spatial distribution and frequency of HQ ≥ 1, and the uncertainty of exposure and effects assumptions.*				
PCBs, dioxins/furans, total DDx	PCBs, dioxins/furans, cPAHs	Dioxins/furans, cPAHs	**Sediment**- PAHs, PCBs, total DDx **TZW**- 4,4'-DDT, total DDx, chlorobenzene, benzo(a)anthracene, benzo(a)pyrene, naphthalene, carbon disulfide, cyanide, cis-1,2-dichloroethene, and TCE	**Fish**- TZW: 4,4'-DDT, total DDx, chlorobenzene, benzo(a)anthracene, benzo(a)pyrene, naphthalene, carbon disulfide, cyanide, cis-1,2-dichloroethene, and TCE (lamprey and sculpin) **Birds**- PCBs, dioxins/furans (individual bald eagles) **Mammals**- PCBs (mink and otter), dioxins/furans (mink) **Amphibians**- None **Aquatic Plants**- None

Table 3.1-1. Identification of Contaminants Posing Potentially Unacceptable Risk and Contaminants of Concern

Note:

1 - Some of the contaminants posing potentially unacceptable risk represent groups of contaminants that are inclusive of other individual contaminants (e.g., total cPAHs are inclusive of individual carcinogenic PAHs such as benzo(a)pyrene).

2 - 44 contaminants posing potentially unacceptable risk had HQs ≥ 1 only for the TZW Line of Evidence (LOE).

3 - 27 contaminants posing potentially unacceptable risk had HQs ≥ 1 only for the TZW LOE.

Table 3.1-2. Contaminants Posing Potentially Unacceptable Risk or Exceeding Water Screening Levels

Analyte	Contaminant Posing Potentially Unacceptable Risk			Contaminant Exceeds Water Screening Levels	
	Human Health	Ecological	Benthic Toxicity Model Chemicals	Surface Water	TZW
Conventionals					
Ammonia			X		
Sulfide			X		
Cyanide		X			X
Perchlorate		X		X	X
Metals		X			
Aluminum[d]				X	X
Antimony	X	X			X
Arsenic[f]	X	X		X	X
Barium		X			X
Beryllium		X			
Cadmium		X	X		X
Chromium			X		X
Cobalt		X			X
Copper		X	X		X
Hexavalent Chromium				X	
Iron		X			X
Lead	X	X	X		X
Magnesium		X			
Manganese		X			X
Mercury	X	X	X	X	X
Nickel		X			X
Potassium		X			
Selenium	X				
Silver			X		X
Sodium		X			
Thallium					X
Vanadium		X			X
Zinc	X	X		X	X
Butyltins					
Monobutyltin		X			
Tributyltin ion		X	X		
PCBs					
Total PCBs (congeners or Aroclors)	X	X	X	X	
Total PCB TEQ	X	X		X	
PCDD/Fs					
2,3,7,8-TCDD				X	
Total Dioxins/Furans [a]					
Total Dioxin/Furan TEQ	X	X		X	X

Table 3.1-2. Contaminants Posing Potentially Unacceptable Risk or Exceeding Water Screening Levels

Analyte	Contaminant Posing Potentially Unacceptable Risk			Contaminant Exceeds Water Screening Levels	
	Human Health	Ecological	Benthic Toxicity Model Chemicals	Surface Water	TZW
Total TEQ	X	X		X	
Herbicides					
Silvex [TM a]					
Organochlorine Pesticides					
2,4'-DDD			X		
4,4'-DDD		X	X	X[c]	X
4,4'-DDE			X	X[c]	X
4,4'-DDT		X	X	X	X
Total of 2,4' and 4,4'-DDD (Sum DDD)	X		X	X	X
Total of 2,4' and 4,4'-DDE (Sum DDE)	X	X	X	X	X
Total of 2,4' and 4,4'-DDT (Sum DDT)	X		X	X	X
Total of 2,4' and 4,4'-DDD, -DDE, -DDT		X		X	X
Aldrin	X	X		x[c]	
cis-Chlordane			X		
Total Chlordanes	X			x[c]	
Dieldrin	X		X	X	
Total Endosulfan			X		
Endrin			X		
Endrin ketone			X		
Heptachlor				X	
Heptachlor Epoxide	X			x[c]	
beta-Hexachlorocyclohexane			X		
delta-Hexachlorocyclohexane			X		
gamma-Hexachlorocyclohexane [b]					
MCPP	X				
Polycyclic Aromatic Hydrocarbons					
2-Methylnaphthalene		X	X		
Acenapthene		X	X		x[c]
Acenapthylene			X		
Anthracene		X	X		
Benzo(a)anthracene	X	X	X	x[c]	X
Benzo(a)pyrene	X	X		X	X
Benzo(b)fluoranthene	X	X	X	X	X
Benzo(b+k)fluoranthene			X		
Benzo(g,h,i)perylene		X	X		
Benzo(k)fluoranthene	X	X	X	X	X
Chrysene		X	X	x[c]	X
Dibenzo(a,h)anthracene	X	X	X	X	X
Fluoranthene		X	X		X

Table 3.1-2. Contaminants Posing Potentially Unacceptable Risk or Exceeding Water Screening Levels

Analyte	Contaminant Posing Potentially Unacceptable Risk			Contaminant Exceeds Water Screening Levels	
	Human Health	Ecological	Benthic Toxicity Model Chemicals	Surface Water	TZW
Fluorene		X	X		
Ideno(1,2,3-cd) pyrene	X	X	X	x[c]	X
Naphthalene		X		X	X
Phenanthrene		X	X		
Pyrene		X	X		
Total HPAHs			X		
Total LPAHs			X		
Total PAHs[e]			X	X	X
Total Carcinogenic PAHs	X				
Phthalates					
Bis(2-ethylhexyl) phthalate	X	X		x[c]	
Butylbenzyl phthalate [a]					
Dibutyl phthalate		X	X		
Diethyl phthalate [b]					
Semivolatile Organic Compounds					
Benzyl Alcohol			X		
Carbazole			X		
Dibenzofuran		X	X		
1,2-Dichlorobenzene		X			X
1,4-Dichlorobenzene		X			X
Hexachlorobenzene	X			x[c]	
Phenols					
4-Methylphenol			X		
Phenol			X		
Pentachlorophenol	X				
Polybrominated Diphenyl Ethers					
Polybrominated Diphenyl Ethers (PBDE)	X				
Volatile Organic Compounds					
1,1-Dichloroethene		X			X
1,2-Dichloroethane					X
1,2-Dichloropropane					X
1,1,2-Trichloroethane					X
1,2,4-Trimethylbenzene		X			X
1,3,5-Trimethylbenzene		X			
Acrolein					X
Benzene		X		X	X
Bromochloromethane					X
Bromodichloromethane					X
Carbon disulfide		X			

Table 3.1-2. Contaminants Posing Potentially Unacceptable Risk or Exceeding Water Screening Levels

Analyte	Contaminant Posing Potentially Unacceptable Risk			Contaminant Exceeds Water Screening Levels	
	Human Health	Ecological	Benthic Toxicity Model Chemicals	Surface Water	TZW
Chlorobenzene		X			X
Chloroethane		X			
Chloroform		X			X
cis-1,2-Dichloroethene		X			X
Ethylbenzene		X		X	X
Isopropylbenzene		X			
Methylene chloride					X
MTBE					X
Tetrachloroethene					X
Toluene		X			
trans-1,2-Dichloroethene					X
Trichloroethene		X		X	X
Vinyl chloride				X	X
m,p-Xylene		X			
o-Xylene		X			
Total xylenes		X			X
Petroleum (TPH)					
Diesel-Range Hydrocarbons		X	X		
Gasoline-Range Hydrocarbons		X			
Residual-Range Hydrocarbons[a]					
Total Petroleum Hydrocarbons[a]					

Notes:

[a] Indicator Chemical in Remedial Investigation

[b] EPA Focused PRG (Preliminary Remedial Goal)

[c] Analyte only exceeds October 2011 Oregon human health water criteria based on a fish consumption rate of 175 grams/day.

[d] Samples exceeded only the EPA non-priority pollutant NRWQC criteria for aluminum that is based on toxicity testing in waters with ph <6.6 and hardness <10 milligrams per liter (mg/L). When Oregon adopted this criterion in its Table 33B aquatic life criteria, it adopted the criterion only under those specific circumstances—where pH is < 6.6 and hardness <10 mg/L, conditions which do not apply to the Site. See OAR 340-041-033 Table 33C note w.

[e] Although until 2011, Oregon had a human health fish consumption standard for Total PAHs, the new October 17, 2011 human health standards no longer include a standard for Total PAHs, nor is there a federal NWRQC for Total PAHs.

[f] Oregon adopted a state-specific arsenic standard October 17, 2011 and Site surface waters no longer exceed the Oregon standard.

HPAH - high molecular weight polycyclic aromatic hydrocarbon
LPAH - low molecular weight polycyclic aromatic hydrocarbon
PAH - polycylic aromatic hydrocarbon
TEQ - toxic equivalent quotient
TPH - total petroleum hydrocarbon
PCB - polychlorinated biphenyl
TZW - transition zone water

Table 3.1-3. Indicator Chemicals Selected for Contaminant Mobility Evaluation in FS

Contaminant mobility and long-term fate and transport modeling
Arsenic
Copper
Mercury
Benzo(a)pyrene
Naphthalene
Total PCBs
4,4'-DDD
4,4'-DDE
4,4'-DDT
BEHP
Contaminant mobility evaluations only
Benzene
Chlorobenzene
Vinyl chloride

Table 3.4-1. ARARs for Remedial Action at the Portland Harbor Superfund Site

Regulation	Citation	Criterion/Standard	Applicability/Appropriateness
Federal ARARs			
Clean Water Act, Section 404 and Section 404(b)(1) Guidelines	33 USC 1344, 40 CFR Part 230	Regulates discharge of dredged and fill material into navigable waters of the United States.	Action-specific. Applicable to dredging, covering, capping, and designation and construction of in-water disposal sites and in-water filling activities in the Willamette River.
Clean Water Act	33 USC 1313, 1314 Most recent 304(a) list, as updated up to issuance of the ROD	Under Section 304(a), minimum criteria are developed for water quality programs established by states. Two kinds of water quality criteria are developed: one for protection of human health, and one for protection of aquatic life.	Chemical-specific and Action-specific. Relevant and appropriate for cleanup standards for surface water and contaminated groundwater discharging to surface water if more stringent than promulgated state criteria. Relevant and Appropriate to short-term impacts to surface water from implementation of the remedial action that result in a discharge to navigable water, such as dredging and capping if more stringent than promulgated state criteria.
Clean Water Act, Section 401	33 USC 1341, 40 CFR Section, 121.2(a)(3), (4) and (5)	Any federally authorized activity which may result in any discharge into navigable waters requires reasonable assurance that the action will comply with applicable provisions of sections 1311, 1312, 1313, 1316, and 1317 of the Clean Water Act.	Action-specific. Relevant and Appropriate to implementation of the remedial action that results in a discharge to the river if more stringent than state implementation regulations.
Clean Water Act, Section 402	33 USC 1342	Regulates discharges of pollutants from point sources to waters of the U.S., and requires compliance with the standards, limitations and regulations promulgated per Sections 301, 304, 306, 307, 308 of the CWA.	Relevant and Appropriate to remedial activities that result in a discharge of pollutants from point sources to the river if more stringent than state promulgated point source requirements.
Safe Drinking Water Act	42 USC 300f, 40 CFR Part 141, Subpart O, App. A. 40 CFR Part 143	Establishes national drinking water standards to protect human health from contaminants in drinking water	Chemical-specific Relevant and Appropriate as a performance standard for groundwater and surface water which are potential drinking water sources.

Table 3.4-1. ARARs for Remedial Action at the Portland Harbor Superfund Site

Regulation	Citation	Criterion/Standard	Applicability/Appropriateness
Resource Conservation and Recovery Act	40 CFR 260, 261	Establishes identification standards and definitions for material is exempt from the definition of a hazardous waste.	Action-specific. Applicable to characterizing wastes generated from the action and designated for off-site or upland disposal; potentially relevant and appropriate for use in identifying acceptance criteria for confined in-water disposal.
RCRA – Solid Waste	40 CFR 257 Subpart A		RCRA Solid Waste requirements may be relevant and appropriate to remedial actions that result in upland or in-water disposal of dredged material. Requirements for the management of solid waste landfills may be relevant and appropriate to upland disposal.
Hazardous Materials Transportation Act	49 USC §5101 et seq. 40 CFR Parts 171-177		Hazardous Materials Transportation Act requirements are applicable to remedial actions that involve the transport of hazardous materials (i.e., dredged material)
Fish and Wildlife Coordination Act Requirements	16 USC 662, 663 50 CFR 6.302(g)	Requires federal agencies to consider effects on fish and wildlife from projects that may alter a body of water and mitigate or compensate for project-related losses, which includes discharges of pollutants to water bodies.	Action-specific. Potentially applicable to determining impacts and appropriate mitigation, if necessary, for effects on fish and wildlife from filling activities or discharges from point sources.
Magnuson-Stevens Fishery Conservation and Management Act	50 CFR Part.600.920	Evaluation of impacts to Essential Fish Habitat (EFH) is necessary for activities that may adversely affect EFH.	Location-specific. Potentially applicable if the removal action may adversely affect EFH.
Federal Emergency Management Act	44 CFR 60.3(d)(2) and (3)		FEMA flood rise requirements are considered relevant and appropriate requirements for remedial actions.
River and Harbors Act	33 USC 401 et seq. 33 CFR parts 320 to 323	Section 10 prohibits the unauthorized obstruction or alteration of any navigable water. Structures or work in, above, or under navigable waters are regulated under Section 10.	Action-specific. Applicable requirements for how remedial actions are taken or constructed in the navigation channel.
Clean Air Act	42 USC §7401 et seq.		Action-specific. Applicable to remedial activities that generate air emissions.

Table 3.4-1. ARARs for Remedial Action at the Portland Harbor Superfund Site

Regulation	Citation	Criterion/Standard	Applicability/Appropriateness
Toxic Substances Control Act	15 USC §2601 et seq.		Chemical-specific. TSCA requirements are applicable to contaminated material or surface water with PCB contamination
Marine Mammal Protection Act	16 USC §1361 et seq. 50 CFR 216		Action-specific. Applicable to remedial actions that have the potential to affect marine mammals.
Migratory Bird Treaty Act	16 USC §703 50 CFR §10.12	Makes it unlawful to take any migratory bird. "Take" is defined as pursuing, hunting, wounding, killing, capturing, trapping and collecting.	Action-specific. Applicable to remedial actions that have the potential to effect a taking of migratory birds.
National Historic Preservation Act	16 USC 470 et seq. 36 CFR Part 800	Requires the identification of historic properties potentially affected by the agency undertaking, and assessment of the effects on the historic property and seek ways to avoid, minimize or mitigate such effects. Historic property is any district, site, building, structure, or object included in or eligible for the National Register of Historic Places, including artifacts, records, and material remains related to such a property.	Action-specific. Potentially applicable if historic properties are potentially affected by remedial activities.
Archeological and Historic Preservation Act	16 USC 469a-1	Provides for the preservation of historical and archeological data that may be irreparably lost as a result of a federally-approved project and mandates only preservation of the data	Action-specific. Potentially applicable if historical and archeological data may be irreparably lost by implementation of the remedial activities.

Table 3.4-1. ARARs for Remedial Action at the Portland Harbor Superfund Site

Regulation	Citation	Criterion/Standard	Applicability/Appropriateness
Native American Graves Protection and Reparation Act	25 USC 3001-3013 43 CFR 10	Requires Federal agencies and museums which have possession of or control over Native American cultural items (including human remains, associated and unassociated funerary items, sacred objects and objects of cultural patrimony) to compile an inventory of such items. Prescribes when such Federal agencies and museums must return Native American cultural items. "Museums" are defined as any institution or State or local government agency that receives Federal funds and has possession of, or control over, Native American cultural items.	Location-specific; action-specific. If Native American cultural items are present on property belonging to the Oregon Division of State Lands (DSL) that is a part of the removal action area, this requirement is potentially applicable. If Native American cultural items are collected by an entity which is either a federal agency or museum, then the requirements of the law are potentially applicable.
Endangered Species Act	16 USC 1531 et seq. 50 CFR 17	Actions authorized, funded, or carried out by federal agencies may not jeopardize the continued existence of endangered or threatened species or adversely to avoid jeopardy or take appropriate mitigation modify or destroy their critical habitats. Agencies are to avoid jeopardy or take appropriate mitigation measures to avoid jeopardy.	Action-specific. Applicable to remedial actions, that may adversely impact endangered or threatened species or critical habitat that are present at the site.
Executive Order for Wetlands Protection	Executive Order 11990 (1977) 40 CFR 6.302 (a) 40 CFR Part 6, App. A	Requires measures to avoid adversely impacting wetlands whenever possible, minimize wetland destruction, and preserve the value of wetlands.	Location-specific. Relevant and appropriate in assessing impacts to wetlands, if any, from the response action and for developing appropriate compensatory mitigation for the project.
Executive Order for Floodplain Management	Exec. Order 11988 (1977) 40 CFR Part 6, App. A 40 CFR 6.302 (b)	Requirements for Flood Plain Management Regulations Areas Requires measures to reduce the risk of flood loss, minimize impact of floods, and restore and preserve the natural and beneficial values of floodplains.	Location-specific. Relevant and appropriate for assessing impacts, if any, to the floodplain and flood storage from the response action and developing compensatory mitigation that is beneficial to floodplain values.
National Flood Insurance Act and Flood Disaster Protection Act	42 USC 4001 et seq. 44 CFR National Flood Insurance Program Subpart A	Requirements for Flood Plain Management Regulations Areas Requires measures to reduce the risk of flood loss, minimize impact of floods, and restore and preserve the natural and beneficial values of floodplains.	Location-specific. Relevant and appropriate for assessing impacts, if any, to the floodplain and flood storage from the response action and developing compensatory mitigation that is beneficial to floodplain values.

Table 3.4-1. ARARs for Remedial Action at the Portland Harbor Superfund Site

Regulation	Citation	Criterion/Standard	Applicability/Appropriateness
State ARARs			
Oregon Environmental Cleanup Law ORS 465.315.	Oregon Hazardous Substance Remedial Action Rules OAR 340-122-0040(2)(a) and (c), 0115(3),(32) and (51).	Sets standards for degree of cleanup required, including for oil and other petroleum products/wastes. Establishes acceptable risk levels for human health at 1x10-6 for individual carcinogens, 1x10-5 for multiple carcinogens, and Hazard Index of 1 for noncarcinogens; and protection of ecological receptors at the individual level for threatened or endangered species and the population level for all others. OAR 340-122-0040 and 0115(3).	Chemical-specific: a risk-based numerical value that, when applied to site-specific conditions, will establish concentrations of hazardous substances that may remain or be managed on-site in a manner avoiding unacceptable risk.
	OAR 340-122-and (b), 340-122-0040(4) 0115(32)	For hot spots of contamination in water, requires treatment, if feasible, when treatment would be reasonably likely to restore or protect beneficial uses within a reasonable time. For hot spots contamination of sediments, requires treatment or excavation and off-site disposal of hazardous substances if treatment is reasonably likely to restore or protect such beneficial uses within a reasonable time.	Chemical-specific and action-specific: when contaminant concentrations fall within the definition of “hot spot” set forth in subpart 0115(32), treatment (including excavation and offsite disposal) of contaminated media to levels below such risk levels or beneficial-use impacts needs to be evaluated in the feasibility study.
Hazardous Waste and Hazardous Materials II	ORS 466.005(7) OAR 340-102-0011 - Hazardous Waste Determination	Defines "Hazardous Waste" and the rule contains the criteria by which anyone generating residue must determine if that residue is a hazardous waste.	Chemical- and Action-specific: specifies substantive requirements if remedial action will involve on-site treatment, disposal, or storage of RCRA-listed or characteristic hazardous waste. (Note: off-site treatment, storage, or disposal subject to all administrative and substantive state requirements.)
	Identification and Listing of Hazardous Waste OAR 340-101-0033	Identifies additional residuals that are subject to regulation as hazardous waste under state law.	Action-specific: specifies requirements if remedial action will involve on-site treatment, disposal, or storage of additional listed wastes.

Table 3.4-1. ARARs for Remedial Action at the Portland Harbor Superfund Site

Regulation	Citation	Criterion/Standard	Applicability/Appropriateness
Solid Waste: General Provisions	Specific regulatory references to be provided by DEQ when alternatives are identified for FS analysis	Substantive Requirements for the location, design, construction, operation, and closure of solid waste management facilities.	Action-specific: applicable if upland disposal facility contemplated on-site for solid, nonhazardous, waste disposal, handling, treatment, or transfer. (Note: off-site transfer, treatment, handling, or disposal subject to all administrative and substantive state requirements.)
	Solid Waste: Land Disposal Sites Other than Municipal Solid Waste Landfills, specific regulatory references to be supplied by DEQ	Requirements for the management of solid wastes at land disposal sites other than municipal solid waste landfills.	Action-specific: applicable to the on-site management and disposal of contaminated sediment, soil, and/or groundwater.
Water Pollution Control Act ORS 468B.048	Water Quality Standards OAR 340-041-0340, Table 20 and Table 33A	DEQ is authorized to administer and enforce CWA program in Oregon. DEQ rules designate beneficial uses for water bodies and narrative and numeric water quality criteria necessary to protect those uses. OAR 340-041-0340 designates and defines the beneficial uses that shall be protected in the Willamette Basin. For the purposes of state law, Table 20 are the applicable criteria, unless there is a corresponding criterion under Table 33A, in which case Table 33A is applicable. (Note: if Oregon promulgates new criteria prior to ROD, such new criteria will be ARAR).	Chemical- and action-specific: applicable to any discharges to surface water from point sources, groundwater, overland flow of stormwater, and activities that may result in discharges to waters of the state, such as, dredge and fill, de-watering sediments, and other remedial activities. Relevant and appropriate as performance standards for sites and where contaminants are left in place.
Water Pollution Control Act ORS 468B.048	Regulations Pertaining to NPDES Discharges Specific regulatory references to be supplied by DEQ	Effluent limitations and management practices for point-source discharges into waters of the state (otherwise subject to NPDES permit but for on-site permit exemption).	Chemical- and Action-specific: applies state water quality standards and effluent limitations to point-source discharges to the Willamette River.

Table 3.4-1. ARARs for Remedial Action at the Portland Harbor Superfund Site

Regulation	Citation	Criterion/Standard	Applicability/Appropriateness
	Certification of Compliance with Water Quality Requirements and Standards ORS 468b.035	Provides that federally-approved activities that may result in a discharge to waters of the State requires evaluation whether an activity may proceed and meet water quality standards with conditions, which if met, will ensure that water quality standards are met.	Action-specific: Applicable to implementation of the remedial action (e.g., dredging, capping, and construction of confined disposal facility) that may result in a discharge to waters of the State.
	Rules Governing the Issuance and Enforcement of Removal-Fill Authorizations within Waters of Oregon Including Wetlands OAR 141-085 0680, 141-085-0695, 141-085-0710, 141-085-0765	Substantive requirements for dredge and fill activities in waters of the state, including in designated Essential Indigenous Anadromous Salmonid Habitat.	Action-specific: Applicable to remedial action dredge and fill activities, capping, and riverbank remediation.
ODFW Fish Management Plans for the Willamette River	OAR 635, div 500	Provides basis for in-water work windows in the Willamette River.	Action-specific. Potentially applicable to timing of implementation of the remedial action due to presence of protected species at the site.
Oregon Air Pollution Control ORS 468A et. seq.	General Emissions Standards OAR 340-226	DEQ is authorized to administer and enforce Clean Air program in Oregon. Rules provide general emission standards for fugitive emissions of air contaminants and require highest and best practicable treatment or control of such emissions.	Action-specific: applicable to remedial actions taking place in on-site uplands. Could apply to earth-moving equipment, dust from vehicle traffic, and mobile-source exhaust, among other things.
Oregon Air Pollution Control ORS 468A et. seq.	Fugitive Emission Requirements OAR 340-208	Prohibits any handling, transporting, or storage of materials, or use of a road, or any equipment to be operated, without taking reasonable precautions to prevent particulate matter from becoming airborne. These rules for “special control areas” or other areas where fugitive emissions may cause nuisance and control measures are practicable.	Action-specific: applicable to remedial actions taking place in on-site uplands. Could apply to earth-moving equipment, dust from vehicle traffic, and mobile-source exhaust, among other things

Table 3.4-1. ARARs for Remedial Action at the Portland Harbor Superfund Site

Regulation	Citation	Criterion/Standard	Applicability/Appropriateness
Indian Graves and Protected Objects ORS 97.740-760		Prohibits willful removal of cairn, burial, human remains, funerary object, sacred object or object of cultural patrimony. Provides for reinterment of human remains or funerary objects under the supervision of the appropriate Indian tribe. Proposed excavation by a professional archeologist of a native Indian cairn or burial requires written notification to the State Historic Preservation Officer and prior written consent of the appropriate Indian tribe. Prohibits persons from excavating, injuring, destroying or damaging archeological sites or objects on public or private lands unless authorized.	
Archeological Objects and Sites ORS 358.905-955 ORS 390.235		Imposes conditions for excavation or removal of archeological or historical materials.	Location-specific; action-specific. Potentially relevant and appropriate if archeological material encountered.
	Survival Guidelines OAR 635-100-0135	Survival Guidelines are rules for state agency actions affecting species listed under Oregon's Threatened or Endangered Wildlife Species law.	Action-and location specific: Substantive requirements of Survival Guidelines relevant and appropriate to remedial activities affecting state-listed species.
Guidance for Assessing Bioaccumulative Chemicals of Concern in Sediment DEQ, 2007		Describes a process to evaluate chemicals found in sediment for their potential contribution to risk as a result of bioaccumulation. Provides alternative methods for developing sediment screening levels and bioaccumulation bioassay data.	To be Considered: in level of cleanup or standard of control that is protective.

Table 3.5-1. Sediment Contaminants with PRGs, Focused PRGs, SQVs, COC Designations, RGs, and RALs

Contaminant	Draft Final BERA and BHHRA Non-Water Contaminants Posing Potentially Unacceptable Risk	PRGs	PRG Above Background and Consistent with the Risk Assessments	Comprehensive Benthic Approach FPM and LRM SQVs	Sediment COCs[e]	EPA Focused PRGs	RALs
Metals							
Aluminum	X						
Antimony	X						
Arsenic[a]	X	X	X			X	
Cadmium	X			X			
Chromium				X			
Copper	X			X			
Lead	X	X		X			
Mercury	X			X			
Nickel							
Selenium	X						
Silver				X			
Zinc	X						
Tributyltin ion	X	X[b]		X			
Butyltins				X			
PAHs							
Benzo(a)anthracene	X	X	X	X			
Benzo(a)pyrene	X	*X*	*X*			X	
Benzo(b)fluoranthene	X	X	X	X			
Benzo(k)fluoranthene	X	X	X	X			
Dibenzo(a,h)anthracene	X	X	X	X			
Indeno(1,2,3-cd)pyrene	X	X	X	X			
Total cPAH (BaPEq)	X	X	X		X	X	X
Total LPAHs				X			
Total PAHs				X			
Total HPAHs				X			
2-Methylnaphthalene				X			
Acenaphthene				X			
Acenaphthylene				X			
Anthracene				X			
Benzo(g,h,i)perylene				X			
Chrysene				X			
Fluoranthene				X			
Fluorene				X			
Phenanthrene				X			
Pyrene				X			
Naphthalene							
Phthalates and SVOCs							
Bis(2-ethylhexyl)phthalate	X						
Dibutyl phthalate	X			X			
Diethyl phthalate							
Hexachlorobenzene	X	X	X				

Table 3.5-1. Sediment Contaminants with PRGs, Focused PRGs, SQVs, COC Designations, RGs, and RALs

Contaminant	Draft Final BERA and BHHRA Non-Water Contaminants Posing Potentially Unacceptable Risk	PRGs	PRG Above Background and Consistent with the Risk Assessments	Comprehensive Benthic Approach FPM and LRM SQVs	Sediment COCs[e]	EPA Focused PRGs	RALs
Pentachlorophenol	X						
4-methylphenol				X			
Benzyl Alcohol				X			
Carbazole				X			
Phenol				X			
Dibenzofuran				X			
PCBs							
PCB-77 (Surrogate for PCB TEQ)							
PCB-126 (Surrogate for PCB TEQ)		X	X				
Total PCBs	X	X	X	X	X	X	X
Total PCB TEQ	X	X	X				
Dioxins/Furans							
Dioxins/Furans					X		
2,3,4,7,8 PCDF (Surrogate for Dioxin/Furan TEQ)		X	X			X	X[c]
Total Dioxin/Furan TEQ	X	X	X				
Pesticides							
Aldrin	X	X	X			X	
Dieldrin	X	X	X	X			
Endrin				X			
Endrin Ketone				X			
Heptachlor Epoxide	X	X	X				
Total Chlordane	X	X	X			X	
Sum DDD	X	X	X	X			X[d]
Sum DDE	X	X	X	X		X	X[d]
Sum DDT	X	X	X	X			X[d]
Total DDx	X	X			X		
4,4'-DDD	X			X			
delta-HCH				X			
gamma-HCH							
beta-HCH				X			
Total endosulfan				X			
2,4'-DDD				X			
4,4'-DDE				X			
4,4'-DDT				X			
cis-Chlordane				X			
Petroleum Hydrocarbons							
Diesel-range hydrocarbons				X			

Notes:

a - Analytes in *italics* are fate and transport model chemicals

b - PRGs for TBT have changed due to updated TRVs (see BERA).

c - 2,3,4,7,8 PCDF RALs selected to represent dioxins/furans as directed by EPA for select alternatives (See Section 4).

d - Sum DDE, Sum DDD, and Sum DDT RALs represent total DDx. Sum DDE focused PRG selected by EPA to represent total DDx. Sum DDD and Sum DDT RALs are for select alternatives as directed by EPA (See Section 4).

e - COCs are defined in Risk Management Recommendations (Kennedy Jenks/Windward 2011)

Table 3.5-2. Focused PRGs and Path Forward for the Draft FS

Chemical	Line of Evidence	Value	Units	Notes	Exposure Area	Additional 10 and 17 March LWG Notes	Path Forward for FS
Metals							
Arsenic	Eco Benthic - PEL SQG	17	mg/kg	No FPM SQG exists	Point by Point	Benthic SQG that will be further evaluated in comprehensive benthic approach.	Evaluated using Comprehensive Benthic Approach
Arsenic	Background DW UPL	3.97	mg/kg		Site-wide		Site already meets PRG on a Site-wide basis.
Cadmium	FPM High SQG	3.51	mg/kg		Point by Point	Benthic SQG that will be further evaluated in comprehensive benthic approach.	Evaluated using Comprehensive Benthic Approach
Chromium	Eco Benthic - PEL SQG	90	mg/kg	No FPM SQG exists	Point by Point	Benthic SQG that will be further evaluated in comprehensive benthic approach.	Evaluated using Comprehensive Benthic Approach
Copper	Eco Benthic - PEC SQG	149	mg/kg	This is lower than the FPM low SQG of 493 mg/kg	Point by Point	Benthic SQG that will be further evaluated in comprehensive benthic approach.	Evaluated using Comprehensive Benthic Approach
Copper	Eco Benthic - FPM High SQG	562	mg/kg	Including both FPM and PEC is inconsistent with other decisions for most chemicals	Point by Point	Benthic SQG that will be further evaluated in comprehensive benthic approach.	Evaluated using Comprehensive Benthic Approach
Lead	Eco Benthic - PEL SQG	91.3	mg/kg	No FPM SQG exists	Point by Point	Benthic SQG that will be further evaluated in comprehensive benthic approach.	Evaluated using Comprehensive Benthic Approach
Mercury	Eco Benthic - FPM High SQG	0.41	mg/kg		Point by Point	Benthic SQG that will be further evaluated in comprehensive benthic approach.	Evaluated using Comprehensive Benthic Approach
Nickel	Eco Benthic - PEL SQG	36	mg/kg	No FPM SQG exists	Point by Point	Benthic SQG that will be further evaluated in comprehensive benthic approach.	Evaluated using Comprehensive Benthic Approach
Silver	Eco Benthic - FPM High SQG	1.72	mg/kg		Point by Point	Benthic SQG that will be further evaluated in comprehensive benthic approach.	Evaluated using Comprehensive Benthic Approach
TBT	Eco - Fish Dietary Assessment - Small Mouth Bass	5.93	mg/kg-OC	Covers all other TBT PRGs except sculpin below.	1 RM		LWG provided EPA with new literature references for fish TRV's related to TBT on July 8, 2010. Current LWG assessment: No TBT fish dietary risks at the site; will be presented in final BERA.
TBT	Eco - Fish Dietary Assessment - Sculpin	3.78	mg/kg-OC	Weak Line of Evidence	AOPC development - point by point, BERA - 1/10th rivermile	EPA would like to retain this PRG but acknowledges that there are uncertainties regarding sculpin exposure in deeper non-nearshore areas that can be discussed in the FS. EPA was unclear how the large additional area included outside the current localized AOPC boundaries should be handled in the FS (i.e., expansion of localized AOPCs or part of Site-wide AOPC). EPA also agreed that the LWG can evaluate data density and quality issues in the FS.	LWG provided EPA with new literature references for fish TRV's related to TBT on July 8, 2010. Current LWG assessment: No TBT fish dietary risks at the site; will be presented in final BERA.
Zinc	Eco Benthic - PEL SQG	315	mg/kg	No FPM SQG exists	Point by Point	Benthic SQG that will be further evaluated in comprehensive benthic approach.	Evaluated using Comprehensive Benthic Approach

Table 3.5-2. Focused PRGs and Path Forward for the Draft FS

Chemical	Line of Evidence	Value	Units	Notes	Exposure Area	Additional 10 and 17 March LWG Notes	Path Forward for FS
PAHs							
BaP	HH Clam Consumption, High Consumption Rate 18 g/day, 10^{-5}	5.9	mg/kg-OC	Weak Line of Evidence	1 RM, excluding navigation channel, (E and W separate)	EPA considered making alternative water depth or consumption exposure assumptions but prefers using assumptions consistent with the risk assessment.	Exposure area was modified to areas above Ordinary Low Water (5.1 NAVD 88) because clams cannot be reasonably harvested under water. Only applied to areas identified in the risk assessment as having risk for this pathway, risk level, and chemical.
BaPEq	HH Tribal Fisher In-water Direct Contact 10^{-6} (cPAH)	423	µg/kg	Cut off at AOPC lines per EPAs June 2009 AOPC development rules	1/2 RM, excluding navigation channel, (E and W separate)	EPA indicated that cutting areas at the AOPC boundary lines is not a rigid rule and the LWG should understand that the future boundary lines might vary somewhat based on the distribution of the chemical concentrations. The exact methods for the LWG to determine these variations is unclear.	Applied on a 1/2 river mile basis outside of the navigation channel. No adjustments for consistency with the risk assessment were needed. Areas outside of existing AOPCs were not included, per EPA agreement, and are evaluated as part of the Site-wide AOPC.
BaPEq	HH HF Fisher Beach Sediment Direct Contact 10^{-6} (cPAH)	162	µg/kg		Beach Type	EPA considered whether this PRG would be part of the Site-wide AOPC or not. They decided that because BaP clam consumption PRG above highlights this same area, that there is no additional area created and this BaP beach PRG should be included as part of the localized AOPCs.	Applied to tribal fisher beaches. Only two beaches in the Study Area were identified as consistent with this pathway and risk level. One is located in AOPC 5 and included in the SMAs. The other beach is outside of the EPA AOPCs and is located downstream of Multnomah channel. This area will be evaluated as part of the Site-wide AOPC.
Total LPAHs	Eco Benthic - FPM High SQG	9300	µg/kg		Point by Point	Benthic SQG that will be further evaluated in comprehensive benthic approach.	Evaluated using Comprehensive Benthic Approach
Total PAHs	Eco Benthic - PEC SQG	22800	µg/kg	No FPM SQG exists	Point by Point	Benthic SQG that will be further evaluated in comprehensive benthic approach.	Evaluated using Comprehensive Benthic Approach
SVOCs							
4-methylphenol	Eco Benthic - FPM High SQG	96	µg/kg	Issues of High Non-Detect and/or High Non-Detect Frequencies	Point by Point	Benthic SQG that will be further evaluated in comprehensive benthic approach.	Evaluated using Comprehensive Benthic Approach
Benzyl Alcoh	Eco Benthic - FPM High SQG	36	µg/kg		Point by Point	Benthic SQG that will be further evaluated in comprehensive benthic approach.	Evaluated using Comprehensive Benthic Approach
Carbazole	Eco Benthic - FPM High SQG	1100	µg/kg		Point by Point	Benthic SQG that will be further evaluated in comprehensive benthic approach.	Evaluated using Comprehensive Benthic Approach
Phenol	Eco Benthic - FPM High SQG	120	µg/kg		Point by Point	Benthic SQG that will be further evaluated in comprehensive benthic approach.	Evaluated using Comprehensive Benthic Approach
Phthalates							
Diethyl Phtha	Eco Benthic - FPM Low SQG	120	µg/kg	EPA said use FPM high, but one does not exist, so FPM Low is shown	Point by Point	EPA would prefer is some more relevant chemical or phthalate were provided by the FPM model. EPA indicated that the chemical list available from the FPM model should be further considered in the FS comprehensive benthic approach.	Evaluated using Comprehensive Benthic Approach

Table 3.5-2. Focused PRGs and Path Forward for the Draft FS

Chemical	Line of Evidence	Value	Units	Notes	Exposure Area	Additional 10 and 17 March LWG Notes	Path Forward for FS
PCBs							
Total PCBs	HH Adult Fish Consumption - Small Mouth Bass - Low IR - 10^{-4}	29.5	µg/kg	Cut off at AOPC lines per EPAs June 2009 AOPC development rules	1 RM	EPA indicated that cutting areas at the AOPC boundary lines is not a rigid rule and the LWG should understand that the future boundary lines might vary somewhat based on the distribution of the chemical concentrations. The exact methods for the LWG to determine these variations is unclear.	Applied on a river mile basis. Applied throughout the Site, because fish move throughout the river. The extent of AOPC 25 was modified to include the extent of the SMA created by this PRG since new data was collected in these area since the AOPC lines were drawn. Limited areas outside of existing AOPCs were not included, per agreement with EPA and are evaluated as part of the Site-wide AOPC.
Total PCBs	Background DW UPL	17	µg/kg	Cut off at AOPC lines per EPAs June 2009 AOPC development rules	Site wide	EPA indicated that cutting areas at the AOPC boundary lines is not a rigid rule and the LWG should understand that the future boundary lines might vary somewhat based on the distribution of the chemical concentrations. The exact methods for the LWG to determine these variations is unclear.	Will be evaluated using Fate and Transport Model to determine whether background levels are met on a Site-wide basis.
Total PCBs	Eco Benthic - FPM High SQG	500	µg/kg		Point by Point	Benthic SQG that will be further evaluated in comprehensive benthic approach.	Evaluated using Comprehensive Benthic Approach
Dioxin Furans							
2,3,4,7,8 PCDF	Eco Bird Dietary Assessment - Sandpiper Worms	0.0541	µg/kg		Beach Type	Sandpiper PRGs should be mapped to sand piper beaches. (Not wide shoreline sediments in general).	Applied to sand piper beaches consistent with BERA.
2,3,4,7,8 PCDF	HH Adult Fish Consumption, Small Mouth Bass Low IR, 10^{-4}	0.0205	µg/kg		1 RM	EPA agreed to move the 10^{-5} PRG to the Site-wide AOPC, but would like to continue to look at the 10^{-4} PRG within the localized AOPCs.	Applied on a river mile basis. Applied throughout the Site because fish move throughout the Site.
2,3,4,7,8 PCDF	Eco - Mink Multi-Species Diet	0.056	µg/kg		1 RM		Applied on a river mile basis.
Pesticides							
Total Chlordane	HH Fish Consumption - Large Home Range Single Species High IR, Low BA 10^{-6}	1.87	µg/kg		Study Area		Mapped on a Site wide basis and carried into the FS with no refinements.
delta-HCH	Eco Benthic - FPM High SQG	2.35	µg/kg		Point by Point	Benthic SQG that will be further evaluated in comprehensive benthic approach.	Evaluated using Comprehensive Benthic Approach

Table 3.5-2. Focused PRGs and Path Forward for the Draft FS

Chemical	Line of Evidence	Value	Units	Notes	Exposure Area	Additional 10 and 17 March LWG Notes	Path Forward for FS
Aldrin	HH Fish Consumption - Large Home Range Single Species High IR, Low BA 10^{-6}	0.84	µg/kg		Study Area	Given that a very small area maps out for PRG that is totally covered by other PRGs, the LWG may want to consider accepting this PRG.	PRG is already met on a Site-wide SWAC-basis. No other PRG was substituted because this was the only aldrin fish consumption PRG above background and consistent with the BHHRA
Dieldrin	Eco Benthic - FPM High SQG	21.5	µg/kg		Point by Point	Benthic SQG that will be further evaluated in comprehensive benthic approach.	Evaluated using Comprehensive Benthic Approach
Endrin	Eco Benthic - FPM High SQG	20.8	µg/kg		Point by Point	Benthic SQG that will be further evaluated in comprehensive benthic approach.	Evaluated using Comprehensive Benthic Approach
Endrin Ketone	Eco Benthic - FPM High SQG	8.5	µg/kg		Point by Point	Benthic SQG that will be further evaluated in comprehensive benthic approach.	Evaluated using Comprehensive Benthic Approach
Gamma HCH	Eco Benthic - PEL SQG	1.38	µg/kg	Issues of high Non-Detect (923 of 1106 samples in BERA dataset were non-detect). No FPM SQG exists	Point by Point	Benthic SQG that will be further evaluated in comprehensive benthic approach.	Evaluated using Comprehensive Benthic Approach
Sum DDD	Eco Benthic - PEC SQG	28	µg/kg	No FPM SQG exists	Point by Point	Benthic SQG that will be further evaluated in comprehensive benthic approach.	Evaluated using Comprehensive Benthic Approach
Sum DDE	Eco Benthic - PEC SQG	31.3	µg/kg	No FPM SQG exists	Point by Point	Benthic SQG that will be further evaluated in comprehensive benthic approach.	Evaluated using Comprehensive Benthic Approach
Sum DDE	HH Adult Fish Consumption, Small Mouth Bass Low IR, 10^{-5}	8.8	µg/kg		1 RM		EPA Focused PRG of Sum DDE HH adult fish consumption, small mouth bass (SMB) low IR, 10^{-5} is inconsistent with the BHHRA (risk does not exceed 10^{-5}). Sum DDE HH adult fish consumption, 10^{-6} large home range fish, low BA, low IR = 3.02 µg/kg was substituted. Results in a similar mapped area applied on a Site-wide basis.
Sum DDT	Eco Benthic - PEC SQG	62.9	µg/kg	No FPM SQG exists	Point by Point	Benthic SQG that will be further evaluated in comprehensive benthic approach.	Evaluated using Comprehensive Benthic Approach
Total DDX	Eco Benthic - FPM High SQG	218	µg/kg		Point by Point	Benthic SQG that will be further evaluated in comprehensive benthic approach.	Evaluated using Comprehensive Benthic Approach

Note:
PRGs where there is disagreement between LWG and EPA that has significant impact on the current AOPC boundaries.
PRGs referenced in EPA's AOPC Development Rules, June 2009

Table 3.5-3. Level Three SQVs from Floating Point Model

Analyte	Units	Chironomus Growth Level 3	Chironomus Survival Level 3	Hyalella Growth Level 3	Hyalella Survival Level 3
Cadmium	mg/kg	3.51	3.51	3.51	3.51
Chromium	mg/kg	na	na	**45.9**	na
Copper	mg/kg	562	na	562	562
Lead	mg/kg	na	na	na	na
Mercury	mg/kg	0.624	0.722	**0.235**	0.722
Nickel	mg/kg	na	na	na	na
Silver	mg/kg	1.72	1.72	1.72	1.72
Zinc	mg/kg	na	na	na	na
Total HPAHs (calc'd)	µg/kg	610,000	610,000	1,300,000	1,300,000
Total LPAHs (calc'd)	µg/kg	650,000	**2,000**	650,000	**2,000**
Benzyl alcohol	µg/kg	36	36	36	36
Carbazole	µg/kg	1,100	2,500	**8,500**	30,000
Dibenzofuran	µg/kg	**340**	7,200	**170**	7,200
4-Methylphenol	µg/kg	**80**	**260**	**260**	**260**
Pentachlorophenol	µg/kg	na	na	na	na
Phenol	µg/kg	120	120	120	120
Total PCBs (calc'd)	µg/kg	**500**	3,500	3,500	3,500
Aldrin	µg/kg	na	na	na	na
beta-Hexachlorocyclohexane	µg/kg	10.8	10.8	10.8	10.8
delta-Hexachlorocyclohexane	µg/kg	2.35	2.35	**1.29**	2.35
Dieldrin	µg/kg	21.5	21.5	21.5	21.5
Endrin	µg/kg	20.8	20.7	na	na
Endrin ketone	µg/kg	8.5	8.5	8.5	8.5
Sum DDD (calc'd)	µg/kg	**114**	**331**	2,460	2,460
Sum DDE (calc'd)	µg/kg	906	906	**906**	**906**
Sum DDT (calc'd)	µg/kg	8,110	8,110	8,110	**8,110**
Total Chlordane (calc'd)	µg/kg	na	na	na	na
Total Endosulfan (calc'd)	µg/kg	**2.42**	na	na	na
Ammonia	mg/kg	276	334	**168**	334
Sulfide	mg/kg	**38.5**	**38.5**	**336**	**336**

Notes:
na: SQV > Maximum concentration in Bioassay Dataset
bold SQGs < AET

Table 3.5-4. Proposed List of RGs and Refined Focused PRGs for the Draft FS

Chemical	RG or Focused PRG - and Rationale	Line of Evidence	Value	Units	Exposure Area
BaP	PRG - due to substantial uncertainty associated with this scenario, the LWG does not recommend use of the term "Focused" in refernce to this PRG.	HH Clam Consumption, High Consumption Rate 18 g/day, 10^{-5}	5.9	mg/kg-OC	1 RM, excluding navigation channel, (E and W separate)
BaPEq	RG - Site COC per RM Report	HH Tribal Fisher In-water Direct Contact 10^{-6} (cPAH)	423	µg/kg	1/2 RM, excluding navigation channel, (E and W separate)
BaPEq	RG - Site COC per RM Report	HH HF Fisher Beach Sediment Direct Contact 10^{-6} (cPAH)	162	µg/kg	Beach Type
Total PCBs	RG - Site COC per RM Report	HH Adult Fish Consumption - Small Mouth Bass - Low IR - 10^{-4}	29.5	µg/kg	1 RM
Total PCBs	Focused PRG - Substantial uncertainty exists with the determination of appropriate background levels	Background DW UPL	17	µg/kg	Site-wide Hilltop
2,3,4,7,8 PCDF	Focused PRG - Not a COC in the RM Report.	Eco Bird Dietary Assessment - Sandpiper Worms	0.0541	µg/kg	Beach Type
2,3,4,7,8 PCDF	RG - Site COC per RM Report	HH Adult Fish	0.0205	µg/kg	1 RM
2,3,4,7,8 PCDF	RG - Site COC per RM Report	Eco - Mink Multi-Species Diet	0.056	µg/kg	1 RM
Total Chlordane	Focused PRG - Not a COC in the RM Report.	HH Fish Consumption - Large Home Range Single Species High IR, Low BA 10^{-6}	1.87	µg/kg	Site

Table 3.5-4. Proposed List of RGs and Refined Focused PRGs for the Draft FS

Chemical	RG or Focused PRG - and Rationale	Line of Evidence	Value	Units	Exposure Area
Sum DDE	RG - Site COC	HH adult fish consumption, 10^{-6} large home range fish, low BA, low IR	3.02	µg/kg	Site
MQ	RG - Site COCs per RM Report	Comprehensive Benthic Risk Approach	0.7	NA	Point by Point

Note:

Focused PRGs identified for the Benthic Line of Evidence are evaluated using the Comprehensive Benthic Risk Approach.

Table 3.6-1. Summary of RG Estimates within the Overall Range of RG Ranges Used for Evaluation of Alternatives (see Appendix E for details)

COC	Exposure Assumption	RG	Risk Type (Cancer/ Noncancer)	Description
Total PCBs (µg/kg)	Smallmouth Bass Whole Body Consumption	5	10^{-5} cancer	95th percentile RG
		13	Noncancer	90th Percentile
		23	**10^{-4} cancer**	**99th percentile RG**
		29.5	**10^{-4} cancer**	**EPA's point estimate**
		95	**10^{-4} cancer**	**95th percentile RG**
	Smallmouth Bass Fillet with Skin Consumption	14	10^{-5} cancer	99th percentile RG
		45	Noncancer	95th percentile RG
		71	10^{-5} cancer	95th percentile RG
	Smallmouth Bass Fillet without Skin Consumption	18	10^{-6} cancer	95th percentile RG
		26	Noncancer	99th percentile RG
		58	10^{-6} cancer	90th percentile RG
Total PCBs (µg/kg)	Ecological - Mink	31		EPA point estimate
		36		5th percentile lower bound RG
		79		5th percentile RG
Total Background PCBs (µg/kg)		**5**		**Kaplan-Meier 95% UCL**
		17		EPA Focused PRG Background
		37		**Kaplan-Meier 95% UPL with a Certain Non-Detect Substitution Scenario**
BaPEq (µg/kg)	Tribal Fisher Sediment Direct Contact	**423**	**10^{-6} cancer**	**EPA point estimate (>99th percentile)**
		1,437	**10^{-6} cancer**	**99th percentile RG**
		2,750	**10^{-6} cancer**	**95th percentile RG**
		3,702	**10^{-6} cancer**	**90th percentile RG**
		14,367	10^{-5} cancer	99th percentile RG
		27,496	10^{-5} cancer	95th percentile RG
		37,020	10^{-5} cancer	90th percentile RG

Notes:

UCL – Upper Confidence Limit

UPL – Upper Probability Limit

RGs in **bold** are those used in later draft FS evaluations as generally representative of the overall relevant RG ranges shown in this table.